UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C. 20460

OFFICE OF
PREVENTION, PESTICIDES
AND TOXIC SUBSTANCES

June 20, 2000

MEMORANDUM

SUBJECT: **CHLORPYRIFOS**. Revised Product and Residue Chemistry Chapters of the HED Chapter of the RED. Chemical Number 059101. DP Barcode D266564.

FROM: Steven A. Knizner, Branch Senior Scientist
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Health Effects Division (7509C)

TO: Mark Hartman, Chemical Review Manager
Reregistration Branch 2
Special Review and Reregistration Division (7508C)

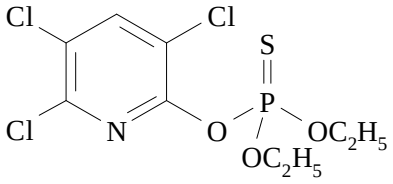
Attached please find the revised product and residue chemistry chapter of the HED chapter of the chlorpyrifos RED. This document contains revisions necessitated because of policy changes (in particular OPPTS Test Guidelines 830 and 860, August, 1996) and receipt of additional data since the May 25, 1999 and September 15, 1994 HED Product and Residue Chemistry Chapter (S.Knizner, 5/25/99, D256118 and S.Knizner 9/15/94, D198040 and D203769).

This chapter focuses on product chemistry data requirements, residue chemistry data requirements, and tolerance reassessment. Acute and chronic dietary exposure analyses are being conducted, based almost exclusively on residue monitoring data provided by the USDA Pesticide Data Program (PDP),the FDA Surveillance Monitoring Program, and a market basket survey conducted by Dow AgroSciences. These dietary exposure analyses are the subject of separate memoranda.

This chapter also incorporates risk mitigation measures adopted by chlorpyrifos registrants in June, 2000. These measures include: restricting application to apples to pre-bloom only with concurrent reassessment of the apple tolerance at 0.01 ppm; cancellation of use on tomatoes and revocation of tomato tolerance; and, reassessment of grape tolerance to 0.01 ppm to reflect the currently registered domestic use pattern (soil application).

## 1.0 PHYSICAL/CHEMICAL PROPERTIES CHARACTERIZATION

Chlorpyrifos [O,O-diethyl O-(3,5,6-trichloro-2-pyridinyl)phosphorothioate] is an organophosphorus insecticide used on food and feed crops, animals and buildings (including food handling establishments, homes, schools and daycare centers), ornamentals, lawns and turf, and terrestrial structures. In addition, chlorpyrifos is registered for use as a mosquitocide. Risk mitigation agreed to by chlorpyrifos registrants will result in eventual cancellation of residential uses.




| | |
|---|---|
| Empirical Formula: | $C_9H_{11}Cl_3NO_3PS$ |
| Molecular Weight: | 350.6 |
| CAS Registry No.: | 2921-88-2 |
| Chemical No.: | 059101 |

Technical chlorpyrifos is a white crystalline solid with a melting point of 41.5-42.5° C. Chlorpyrifos is stable in neutral and acidic aqueous solutions; however, stability decreases with increasing pH. Chlorpyrifos is practically insoluble in water, but is soluble in most organic solvents (i.e., acetone, xylene and methylene chloride). Chlorpyrifos is not particularly volatile based on its low vapor pressure of $1.87 \times 10^{-5}$ mmHg at 20°C (Merck Index, 11th Edition). Its maximum attainable vapor concentration is 25 ppb at 25° C.

TGAI data requirements concerning the DowAgroscience's 99% T (EPA Reg. No. 62719-44) and the 97% T (EPA Reg. No. 62719-15) are satisfied. Guideline 830.6314 data requirements remain outstanding for the DowElanco 99% T. There are 45 chlorpyrifos Manufacturing-Use Products (MPs). Data remain outstanding for many MPs. Provided that the registrants submit the data required in the attached summary tables for the chlorpyrifos MPs, and either certify that the suppliers of starting materials and the manufacturing processes for the chlorpyrifos technicals and manufacturing-use products have not changed since the last comprehensive product chemistry review or submit complete updated product chemistry data packages, HED has no objections to the reregistration of chlorpyrifos with respect to product chemistry data requirements.

A search of the Reference Files System (REFS) conducted 10/27/98 identified 35 chlorpyrifos manufacturing-use products (MPs) registered under Shaughnessy No. 059101; these MPs are listed in Table 1. The products listed below are the only MPs subject to reregistration eligibility decisions.

| Table 1. Registered MPs of chlorpyrifos. | | | | |
|---|---|---|---|---|
| **EPA Reg. No.** | **Formulation** | **Registrant** | **Reg. Date** | **Transferred from: Registrant EPA Reg. No. (date)** |
| 279-3134 | 62.5% FI | FMC | 10/93 | |
| 432-570 | 16% FI | Agrevo | 06/81 | |
| 432-571 | 16% FI | | 06/81 | |
| 432-615 | 25% FI | | 11/81 | |
| 432-648 | 16% FI | | 04/82 | |
| 432-649 | 16% FI | | 04/82 | |
| 432-661 | 25% FI | | 09/82 | |
| 432-662 | 25% FI | | 09/82 | |
| 432-682 | 15% FI | | 10/82 | |
| 432-692 | 16% FI | | 11/82 | |
| 769-690 | 44.8% FI | Sureco, Inc. | 03/73 | Southern Mill Creek Products 6720-195 (12/28/92) |
| 1021-1215 | 20% FI | McLaughlin Gormley King Company | 04/90 | |
| 1021-1220 | 20% FI | | 10/72 | |
| 1021-1221 | 20% FI | | 10/72 | |
| 1021-1434 | 20% FI | | 08/81 | |
| 1021-1438 | 8.363% FI | | 1/81 | |
| 1021-1444 | 8.363% FI | | 04/81 | |
| 1021-1506 | 14.286% FI | | 03/82 | |
| 4816-447 | 5.0% FI | Agrevo Environmental Health | 04/73 | |
| 4816-622 | 5% FI | | 03/81 | |
| 4816-634 | 10% FI | | 12/81 | |
| 4816-638 | 5% FI | | 02/82 | |
| 10350-10 | 20% FI | 3M/Animal Care Products | 11/85 | |
| 11678-45 | 94% FI | Makhteshim Chemical Works Ltd. | 01/90 | |
| 11678-54 | 94% FI | | 04/96 | |
| 42519-13 | 99% FI | Luxembourg-Pamol, Inc. | 07/95 | |
| 45600-6 | 41% FI | Insecta Sales Inc. | 03/83 | |

| Table 1. Registered MPs of chlorpyrifos. | | | | |
|---|---|---|---|---|
| **EPA Reg. No.** | **Formulation** | **Registrant** | **Reg. Date** | **Transferred from: Registrant EPA Reg. No. (date)** |
| 51036-217 | 61.5% FI | Micro-Flo Co. | 07/94 | |
| 62719-15 | 97% T [b] | Dow AgroSciences LLC | 12/89 | Dow 464-404 (12/4/89) |
| 62719-44 | 99% T | | 12/89 | Dow 464-558 (12/4/89) |
| 62719-45 | 30% FI | | 12/89 | Dow 464-559 (12/4/89) |
| 62719-66 | 62.5% FI | | 12/89 | Dow 464-588 (12/4/89) |
| 62719-76 | 62.5% FI | | 12/89 | Dow 464-608 (12/4/89) |
| 62719-78 | 50% FI | | 12/89 | Dow 464-610 (12/4/89) |
| 62719-225 | 22.8% FI | | 08/92 | |

[a] The registrant has changed from Penick to Roussel without change in company number (432).
[b] REFS lists these products as formulation intermediates (FIs); however, because they contain no intentionally added inert ingredients, these products have been identified as Ts in previous reviews and will be identified as Ts in this document.

## Regulatory Background

The regulatory background for chlorpyrifos products in terms of comprehensive product chemistry reviews is presented below in Table 2. Only products for which data have been submitted are included in the table. In summary, the Chlorpyrifos Guidance Document dated 9/28/84 required that data pertaining to all product chemistry requirements be submitted in support of the reregistration of chlorpyrifos; the Chlorpyrifos SRR (second round review) dated 11/18/88 reviewed and or re-evaluated all product chemistry data submitted in response to the Guidance Document.

**Table 2**
**Regulatory background for chlorpyrifos MPs for which data have been submitted.**

| **Products (EPA Reg. No.)** | **September 1984 Guidance Document** | | **November 1988 SRR** | |
|---|---|---|---|---|
| | **Data Required** | **Data submitted in response** | **Data required** | **Data submitted in response** |
| 99% T (62719-44) | 61-1, -2, -3<br>62-1, -2, -3<br>63-2 through -20 | 61-1, -2, -3<br>62-1, -2, -3<br>63-2, -3, -4, -5, -7, -8, -9, -11, -13, -17, -20 | 61-3<br><br>63-7,-11, -14,-15,-16, -17,-20 | 61-3<br><br>63-7,-11,-16, -17, -20 |

**Table 2**
**Regulatory background for chlorpyrifos MPs for which data have been submitted.**

| Products (EPA Reg. No.) | September 1984 Guidance Document | | November 1988 SRR | |
|---|---|---|---|---|
| | Data Required | Data submitted in response | Data required | Data submitted in response |
| 97% T (62719-15) | 61-1, -2, -3<br>62-1, -2, -3<br>63-2 through -20 | 61-1, -2, -3<br>62-1, -2, -3<br>63-2,-3,-4,-5,-7,-8,-9, -11,-13,-14,-16,-17, -20 | 61-2, -3<br>62-1<br>63-7,-11,-14, -15 | 61-2, -3<br>62-1<br>63-7,-11,-14 |
| 62.5% FI (62719-66) | 61-1, -2, -3<br>62-1, -2, -3<br>63-2 through -20 | 61-1, -2, -3<br>62-1, -2, -3<br>63-2, -3, -4, -7, -15,-17, -18, -20 | 61-3<br><br>63-12,-14,-16,-17,-19, -20 | none |
| 62.4% FI (62719-51) | 61-1, -2, -3<br>62-1, -2, -3<br>63-2 through -20 | 61-1, -2, -3<br>62-1, -2, -3<br>63-2, -3, -4, -7,-15,-17, -18, -20 | 61-3<br><br>63-12, -14, -16,-17, -19, -20 | none |
| 61.5% FI (62719-10) | 61-1, -2, -3<br>62-1, -2, -3<br>63-2 through -20 | 61-1, -2, -3<br>62-1, -2, -3<br>63-2, -3, -4, -7, -15, -17, -18, -20 | 61-3<br><br>63-12, -14, -16, -19 | none |
| 52.4% FI (62719-49) | 61-1, -2, -3<br>62-1, -2, -3<br>63-2 through -20 | 61-1, -2, -3<br>62-1, -2, -3<br>63-2, -3, -4, -7, -15,-16, -17, -18,-20 | 61-2, -3<br><br>63-12,-14, -15,-17,-19, -20 | none |
| 30% FI (62719-45) | 61-1, -2, -3<br>62-1, -2, -3<br>63-2 through -20 | 61-1, -2, -3<br>62-1, -2, -3<br>63-2, -3, -4, -7,-12,-15, -17,-18,-19, -20 | 61-1, -3<br><br>63-7, -14, -16, -17, -20 | none |
| 41% FI (45600-6) | 61-1, -2, -3<br>62-1, -2, -3<br>63-2 through -20 | 61-1, -2, -3<br>62-1, -2, -3<br>63-2, -3, -4, -7,-15,-16, -18, -19, -20 | 61-1, -2<br><br>63-7,-12,-14,-17, -20 | none |
| 25% FI (432-625 and 432-662) | 61-1, -2, -3<br>62-1, -2, -3<br>63-2 through -20 | 61-1, -2, -3<br>62-1, -2, -3<br>63-2, -3, -4, -7, -12,-14, -15,-16,-17, -18, -19, -20 | 61-1<br><br>63-14, -16, -17, -20 | none |

The Chlorpyrifos SRR required preliminary analysis of one product, the DowElanco 97% T (EPA Reg. No. 62719-15), for dipyridine analogues of chlorinated dibenzo-p-dioxins. The requested

study indicated that no dioxin analogues were detected at levels of toxicological significance. On review of the data, the Agency concluded (CBRS No. 11403, D188256, MRID No. 42544901, 6/16/93, S. Funk) that no further analysis for dioxin analogues was required for technical chlorpyrifos.

The current status of the product chemistry data requirements for the MPs listed in Table 1 is presented in the attached data summary tables (see Appendix I). Refer to these tables for a listing of the outstanding product chemistry data requirements.

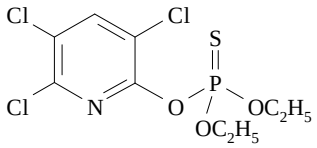
## 2. RESIDUE CHEMISTRY CHARACTERIZATION

REGULATORY BACKGROUND

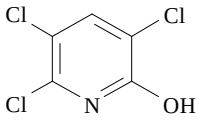
Chlorpyrifos was the subject of a Reregistration Standard Guidance Document dated 9/28/84; the Residue Chemistry Science Chapter of the Guidance Document was dated 1/25/84. The Chlorpyrifos Second Round Review (SRR) was issued 11/18/88; an addendum to the SRR was issued 1/13/89. Several residue chemistry studies have been submitted since issuance of these documents, and all pertinent data have been evaluated by HED.

The ranges of chlorpyrifos established tolerances are 0.01-13 ppm for crop commodities, 0.01-0.25 ppm for eggs, milk, and animal tissues, and 0.1-25 ppm for processed food/feeds. Adequate residue analytical methods are available for the enforcement of established chlorpyrifos tolerances. The established tolerances in/on raw agricultural, animal, and processed food/feed commodities are expressed either in terms of the combined residues of chlorpyrifos and its metabolite 3,5,6-trichloro-2-pyridinol (TCP) *[40 CFR §180.342 (a) and (b), 185.1000 (a), and 186.1000 (a)]* or as chlorpyrifos *per se [40 CFR §180.342 (c), (d), and (e) and 185.1000 (c) and (d)]*. However, OPP has determined that TCP is not of toxicological concern can be excluded from the tolerance expression (PP3F2884 and 3F2947 and FAP3H5396 and 3H5411/R1191, Final Rule, D.Barolo, 4/1/93). The conclusions specified in the "Tolerance Reassessment Summary" section of this document reflect this decision and recommendation to consider only chlorpyrifos *per se* as the residue of concern. The chemical structures of chlorpyrifos and its metabolite, TCP are depicted below in Figure B.

Figure B: Chemical structures of chlorpyrifos and its metabolite, TCP.




Chlorpyrifos




TCP

The information contained in this document summarizes the status of the residue chemistry data requirements, in accordance with OPPTS Test Guidelines Series 860, Residue Chemistry,

with respect to the reregistration of chlorpyrifos.

### a. Residue Chemistry Data Requirements

### i. GLN 860.1200: Directions for Use

A REFS search conducted 5/99 identified 32 chlorpyrifos end-use products (EPs) with food/feed uses registered to Dow AgroSciences and Y-TEX Corporation. These EPs are presented in Table 3.

**Table 3. Chlorpyrifos end-use products with food/feed uses**

| Registrant EPA Reg. No. | Acceptance Date | Formulation Class | Product Name |
|---|---|---|---|
| **Y-TEX Corporation** | | | |
| 39039-2 | 1/15/90 [a] | 5% Impr | Max-Con Insecticide Ear Tags |
| 39039-6 | 12/14/94 | 1% Impr | Warrior Insecticide Cattle Ear Tag |
| **Dow AgroSciences** | | | |
| 62719-14 | 9/1/92 | 0.5% G | Dursban ½ G Granular Insecticide |
| 62719-210 | 9/1/92 | 1% G | Dursban 1G Insecticide |
| 62719-85 | 1/15/90 [a] | 7.5% G | Lorsban 7.5G Granular Insecticide |
| 62719-34 [b] | 5/27/93 | 15% G | Lorsban 15G Granular Insecticide |
| 62719-38 | 1/15/90 [a] | 50% WP | Lorsban 50-SL Wettable Powder Insecticide |
| 62719-39 [c] | 5/27/93 | 50% WP | Lorsban 50W Wettable Powder Insecticide |
| 62719-68 | 1/15/90 [a] | 50% WP | Dursban 50W Insecticide |
| 62719-72 | 8/23/93 | 50% WP | Dursban 50W in Water Soluble Packets |
| 62719-221[d] | 5/27/93 | 50% WP | Lorsban 50W in Water Soluble Packets |
| 62719-74 | 3/17/92 | 1 lb/gal Mcap | Dursban ME Insecticide |
| 62719-88 | 11/18/93 | 1.7 lb/gal Mcap | Dursban ME20 Microencapsulated Insecticide |
| 62719-29 | 4/30/93 | 1% Impr | Polyethylene D |
| 62719-163 | 1/5/93 | 50% DF | Dursban 50DF Insecticide |
| 62719-56 | 12/9/93 | 1 lb/gal EC | Dursban 1-12 Insecticide |
| 62719-65 | 12/9/93 | 2 lb/gal EC | Dursban 2EC Insecticide |
| 62719-79 | 8/19/92 | 2 lb/gal EC | Lock-On Insecticide |
| 62719-166 | 6/12/91 | 2 lb/gal EC | Dursban Pro |
| 62719-11 [e] | 9/29/92 | 4 lb/gal EC | Dursban 4E Insecticide |
| 62719-41 | 1/15/90 [a] | 4 lb/gal EC | Dursban 4 Plus Insecticide |
| 62719-46 | 11/91 | Ready-to-use Soln. | Dursban WB05 |
| 62719-54 | 11/91 | Dust | Dursban 1-D |
| 62719-55 | 9/27/93 | 4 lb/gal EC | Dursban LO |
| 62719-23 [f] | 5/27/93 | 4 lb/gal EC | Lorsban 4E Insecticide |
| 62719-89 | 10/93 | Mcap | Dursban ME04 Microencapsulated |
| 62719-220 [f] | 11/29/93 | 4 lb/gal EC | Lorsban 4E |
| 62719-245[g] | 11/29/93 | 4 lb/gal EC | Lorsban 4E-SG |
| 62719-197 | 4/3/92 | 0.5% RTU | Dursban WB05 III |

[a] Copy of label was obtained from a Product Label DCI dated 1/15/90.

[b] Includes SLN No. MO890008, CA980016, CA990004.

[c] Includes SLN Nos. AZ870006, CA860066, FL900005, FL920007, GA930003, and HI930010.

[d] Includes SLN Nos. AZ940003, AZ970002, CA940001, FL920009, FL920010, GA930004, HI930011, NM950001,

and TX950011.

[e] Includes SLN No. MS930012.

[f] Includes SLN Nos. AR940005, AZ940004, CA940013, CA940014, CA940015, CA940016, CA940017, CA940018, CA940024, CA950014, CA950015, CA970007, DE930004, FL940003, ID950013, ID940012, ID940013, ID910013, MI940001, MI940002, MO940001, MS940005, NV940002, OR940027, OR940028, OR940030, OR940031, OR940032, OR940033, OR940034, OR940035, OR950009, OR970009, TN940001, WA940002, WA940003, WA940004, and WA970008.

[g] Includes SLN Nos. MN960003 and ND950006.

A comprehensive summary of the registered food/feed use patterns of chlorpyrifos, based on these product labels, is presented in Table B (APPENDIX II). A tabular summary of the residue chemistry science assessments for reregistration of chlorpyrifos is presented in Table C (APPENDIX II). The conclusions listed in Table C regarding the reregistration eligibility of chlorpyrifos food/feed uses are based on the use patterns registered by the basic producers, Dow AgroSciences and Y-TEX (ear tag uses only). When end-use product DCIs are developed (e.g., at issuance of the RED), RD should require that all end-use product labels (e.g., MAI labels, SLNs, and products subject to the generic data exemption) be amended such that they are consistent with the basic producer labels.

**ii. GLN 860.1300**

**(a): Plant Metabolism**

The qualitative nature of the residue in plants is adequately understood based on acceptable metabolism studies with a cereal grain (corn) and a root and tuber vegetable (sugar beets). The terminal residue of concern in/on plants is chlorpyrifos *per se*. The requirement for a third crop (legume vegetable) metabolism study is waived because: (i) the corn and sugar beet studies adequately identified the majority of the total radioactive residues (TRR) using GC or HPLC and confirmed by mass spectroscopy; and (ii) the TRR in both corn grain and foliage, and in sugar beet foliage were sufficiently characterized and identified. Earlier metabolism studies with apples, dry beans, and soybeans, although not completely acceptable, provide supplemental data to elucidate the metabolism of chlorpyrifos in plants.

**(b): Animal Metabolism**

The qualitative nature of the residue in animals is adequately understood based on acceptable poultry and ruminant metabolism studies. The residue of concern in animals is chlorpyrifos *per se*. There are presently no direct application uses of chlorpyrifos on meat- and milk-producing animals, except for ear tag treatment of cattle (beef and lactating and non-lactating dairy).

**iv. GLN 860.1340: Residue Analytical Methods - Plants and Animals**

The requirements for residue analytical methods are fulfilled for purposes of reregistration. In consideration of HED's decision to regulate only the parent chlorpyrifos, acceptable methods are available for enforcement and data collection purposes. The behavior of chlorpyrifos using

FDA's multiresidue protocols has also been investigated and reported.

For the enforcement of tolerances in plant commodities, the Pesticide Analytical Manual (PAM Vol. II) lists three GLC methods (designated as Methods I, II, and VI) with phosphorus-specific flame photometric detection (FPD) and a detection limit of 0.01 ppm, as available for the determination of chlorpyrifos *per se*. Three confirmatory procedures (p-values, hydrolysis of chlorpyrifos to TCP followed by GLC determination, and mass spectrometry) are listed as Method A. PAM Vol. II Method VII hydrolyzes chlorpyrifos to TCP to quantify TCP plus chlorpyrifos; TCP residues are then determined by difference.

For the enforcement of tolerances in animal commodities, PAM Vol. II lists a GLC method (designated as Method IV) with electron capture detection (ECD) and a detection limit of 0.01 ppm, as available for determination of chlorpyrifos *per se*. PAM Vol. II Method V determines free TCP in meat. Residue data used for tolerance establishment and/or reassessment were collected using the enforcement methods (or modifications of the enforcement methods). In the majority of the situations, these data were supported by acceptable concurrent method recoveries.

The FDA PESTDATA database dated 8/93 (PAM Vol. I, Appendix II) indicates that chlorpyrifos is completely recovered (>80%) using FDA multiresidue method protocols D (Section 232.4) and E (Section 212.1/232.1, nonfatty matrices) and partially (50-80%) recovered using multiresidue method protocol E (Section 211.1/232.1, fatty matrices).

**v. GLN 860.1380: Storage Stability**

The requirements for storage stability data are fulfilled for purposes of reregistration. Acceptable storage stability studies have been conducted on representative oil seeds, non-oily grains, root crops, fruits and fruiting vegetables, and low moisture content forage and hay. Additional studies have also been conducted to investigate the frozen stability of chlorpyrifos in selected processed food/feed commodities and in animal tissues and milk. The storage conditions and intervals of commodity samples used for tolerance establishment and reassessment are supported by adequate storage stability data.

**Oil seeds**: Residues of chlorpyrifos and TCP are stable in/on almonds and almond hulls stored at -18 ºC for 9 months and in/on walnuts stored at -18 ºC for 4 years.

**Non-oily grains**: Residues of chlorpyrifos and TCP are stable in/on corn grain, forage, and fodder stored at -18 ºC for 27 months, in/on sweet corn fodder stored at -18 º C for almost 3 years, and in/on sorghum grain, forage, and fodder stored at -18 ºC for 3 months.

**Root and bulb crops**: Residues of chlorpyrifos and TCP are stable in/on sweet potatoes stored at -18 ºC for 4 months, in/on sugar beet roots stored at -18 º C for almost 4 years, and in/on onions stored at -23 ºC for 15 months.

**Fruits and fruiting vegetables**: Residues of chlorpyrifos and TCP are stable in/on apples, apricots, cherries, peaches, pears, and plums stored at -18 ºC for 9 months, in/on whole bananas and banana pulp and peel stored under frozen storage conditions (temperature unspecified) for 3 months, in/on tomatoes stored at -18 ºC up to 29 months, and in/on cherries stored at -23 ºC for 15.6 months, and in/on whole oranges stored at -18 º C for 6 months.

**Low moisture content forage/hay**: Residues of chlorpyrifos and TCP are stable in/on fresh and spent mint hay stored under frozen storage conditions (temperature unspecified) for 10 months and in/on alfalfa forage and hay stored at -18 ºC for 12 months.

**Processed commodities**: Residues of chlorpyrifos and TCP are stable in orange peel and pulp stored at -18 º C for 5-6 months and in mint oil stored under frozen storage conditions (temperature unspecified) for 10 months.

**Animal commodities**: Residues of chlorpyrifos *per se* are stable in cattle tissues stored at -18 º C for up to 41 months and in milk stored at -18 ºC for 49 months.

**vi., vii., viii. GLN 860.1400: Magnitude of the Residue - Potable Water, Fish, Irrigated Crops**

Data are not required for these topics since use patterns of chlorpyrifos are unlikely to lead to primary residues in these commodities.

**ix) GLN 860.1500 and 860.1520: Magnitude of the Residue - Crop Field Trials/Processed Commodities**

The reregistration requirements for magnitude of the residue in plants are fulfilled for the following crops: alfalfa; apples; bananas; beans; blueberry; Brassica leafy vegetables (broccoli, Brussels sprouts, cabbage, cauliflower, Chinese cabbage); caneberries (*Rubus* spp.); cherimoya; citrus fruits; corn (field and sweet); cotton; cranberries; cucumbers; feijoa; figs; grapes; kiwifruits; mint; leeks; mushrooms; nectarines; peaches; peanuts; pears; peas; plums; pumpkins; radish; rutabagas; sapote; soybeans; sorghum; strawberries; sugar beet; sugarcane; sunflowers; sweet potatoes; tobacco; turnip; and wheat. Adequate field trials, depicting residues of chlorpyrifos *per se* (or combined residues of chlorpyrifos and the TCP metabolite) following treatment according to the maximum registered use patterns have been submitted for these crops.

The following data requirements and/or label revisions for magnitude of the residue in plants remain outstanding or are now required:

" For asparagus, no additional residue data are required. However, a label revision is needed. The maximum equivalent rate of 1.9 lb ai/A specified by a homeowner-use label (EPA Reg. No. 62719-56) should be adjusted to reflect the maximum

registered rate of 1.0 lb ai/A for which adequate residue data are available. In a letter to the Agency dated 5/8/95 the registrant committed to correcting the label directions to 1.0 lb ai/A at the next label printing.

" For corn, label restrictions prohibiting feeding of silage, forage, or fodder to meat or dairy animals are not practical and must be removed from SLN DE930004 and FL940003 labels. Additional data must be submitted to determine if established tolerances on corn forage and fodder are adequate for these uses. Alternatively, these SLN uses may be canceled.

" For cotton, feeding restrictions for gin trash (gin by-products) are not practical and must be removed from product labels. Appropriate tolerances for cotton gin by-products must be proposed. The proposal must be supported by adequate residue data conducted according to the maximum use patterns.

" For crops grown solely for seed (clover, and grasses), tolerance proposals and adequate field residue data are required to support SLN (Section 24-c) uses. The Oregon Clover Association has indicated that it will support chlorpyrifos SLN (OR850032) use on clover grown for seed. The requirements specified in the Addendum to the Chlorpyrifos SRR remain outstanding. For grasses grown for seed, appropriate tolerances for residues of chlorpyrifos *per se* in/on grass forage and hay must be proposed. The proposal must be supported by adequate residue data conducted according to the maximum use patterns specified by NV940002, and OR94032. Alternatively, these SLN uses may be canceled.

" For peppers, the requirements specified by the Addendum to the Chlorpyrifos SRR to submit English translations of labels for all products that permit use of chlorpyrifos on peppers imported to the U.S. have not been fulfilled. Chlorpyrifos use on peppers was approved at the issuance of the SRR, SLN (FL920007, FL920009, GA930003, and GA930004).

" For sorghum, data are required for aspirated grain fractions.

" For the almonds, filberts, pecans, walnuts, and macadamia nuts, the Addendum to the Chlorpyrifos SRR did not require additional data to support the established crop group tolerance. However, an examination of the recently amended labels for the 4 lb/gal EC formulation (EPA Reg. Nos. 62719-23 and 62719-220) indicated that a maximum seasonal rate of 10 lb ai/A was inadvertently approved for pecans. The available residue data, reflecting combined residues of chlorpyrifos and TCP in/on pecans and other representative members of this crop group, only support a maximum seasonal rate of 5 lb ai/A. If the registrant wishes to support a seasonal rate of 10 lb ai/A, then additional data are required. Alternatively, the labels for pecans may be revised to reflect a maximum seasonal rate of 5 lb ai/A. In a letter

to the Agency dated 5/8/95, DowElanco stated that they would modify labels to reflect a maximal seasonal use rate of 5 lb ai/A for pecans at the next label printing. The latest approved label for Lorsban 4E (EPA Reg. No. 62719-220), dated 4/8/96 did not include this modification. The labels should be revised or appropriate residue data supplied. Because chlorpyrifos labels permit application only to almonds, filberts, pecans, walnuts, (all foliar applications) and macadamia nuts (only trunk spray {bark} application, SLNs HI930010 and HI930011), DowAgrosciences has requested that only these nuts be considered in the dietary exposure assessment. HED has no objections to this request based on revocation of the crop group tolerance and establishment of individual tolerances for the aforementioned nuts.

" For soybeans, sorghum and wheat, data are required for aspirated grain fractions.

[Note: The field trial data submitted for asparagus, apples, sugar beets, and nuts depict combined residues of chlorpyrifos and TCP. In the absence of adequate data depicting chlorpyrifos *per se* on the commodities of these crops, the established tolerances, for tolerance reassessment purposes, should remain at the existing levels. It is the registrant's prerogative to petition the Agency and submit additional field residue data depicting chlorpyrifos *per se* in/on these crops if tolerance-level reductions or lower anticipated residue calculations are desired.]

**Processed Foods/Feeds**

The reregistration requirements for magnitude of the residue in processed food/feed commodities are fulfilled except for a sorghum processing study. According to OPPTS 860.1000 (Table 1), residue data for sorghum flour are not needed at this time because it is used exclusively as a component of drywall, and not as a food or animal feed item, in the US. However, because 50% of the worldwide sorghum production is used for human consumption, data may be needed at a later time.

Acceptable processing studies have been submitted and evaluated for apples, citrus, corn, cottonseed, figs, grapes, mint, peanuts, plums, soybeans, sugar beets, sugarcane, sunflowers, tomatoes, and wheat. The requirements for processing data on alfalfa meal are waived because residue data indicate that levels of chlorpyrifos *per se* are not likely to exceed the established tolerance in alfalfa hay following tests conducted according to registered uses.

[Note: The available processing data for apples and sugar beets depict combined residues of chlorpyrifos and TCP. In the absence of adequate data depicting chlorpyrifos *per se* on the processed commodities of these crops, the established feed additive tolerances, for tolerance reassessment purposes, should remain at the existing levels. It is the registrant's prerogative to petition the Agency and submit additional processing data depicting chlorpyrifos *per se* in/on these commodities if tolerance-level reductions or lower anticipated residue calculations are desired.]

**x. GLN 860.1460: Magnitude of the Residue in Food-Handling Establishments**

The reregistration requirements for magnitude of the residue in food-handling establishments are fulfilled. Sufficient data exist to determine that when registered formulations are used according to label directions, no detectable residues (<0.01-<0.025 ppm) are likely to occur in food items. Bait and insecticidal strip uses would not result in residues greater than those resulting from spray applications.

The prescribed conditions for use of chlorpyrifos formulations in food-handling establishments, as outlined in §185.1000(b), are adequate. In addition, the tolerances established in §185.1000(c) for residues in food items (other than those already covered by a higher tolerance as a result of use on growing crops), in food-service establishments where food and food products are prepared and served, resulting from the application of the microencapsulated formulation are adequate.

**xi. GLN 860.1480: Magnitude of the Residue in Meat, Milk, Poultry, and Eggs**

The reregistration requirements for magnitude of the residue in animals are fulfilled. There are presently no registered direct application uses of chlorpyrifos on livestock animals except for ear tag treatment of cattle (beef and lactating and non-lactating dairy). An acceptable residue transfer study of chlorpyrifos to milk and cream from dairy cows wearing chlorpyrifos-impregnated tags has been submitted; data from this study indicate that residues in whole milk and fat resulting from eartag use should not be a significant fraction of the residues resulting from intake of animal feeds containing chlorpyrifos. Cattle and poultry feeding studies have been evaluated and found adequate to satisfy feeding study requirements.

Confirmatory data are required to support use of a 0.5X reduction factor for cooking of meat. This factor was applied to all cooked meat products in the dietary exposure analysis. The registrant should submit a protocol for Agency review prior to conducting the meat cooking study.

**xii., xiii.: GLNs 860.1850 and 860.1900: Confined/Field Rotational Crops**

Provided that Dow AgroSciences modifies all labels for its chlorpyrifos containing products to limit application to 5 lb ai/A/season on those crops where rotation to another crop could occur (as was stated in their letter to the Agency dated 8/12/94), HED will not require field rotational crop studies. Furthermore, a 30 day plant back interval for rotational crops would then be appropriate.

**6. Tolerance Reassessment Summary**

The Agency has concluded that the TCP metabolite of chlorpyrifos is not of toxicological

concern and no longer needs to be regulated, and therefore, should be excluded from the tolerance expression. The tolerance levels should be amended to reflect residues of chlorpyrifos *per se*. Based on the Agency's decision to change the tolerance expression, the tolerances listed in 40 CFR need to be reorganized as follows.

| Current Tolerance | | Tolerance Reassessment | |
|---|---|---|---|
| **40 CFR** | **Expression [Restrictions]** | **40 CFR** | **Tolerance Expression [Restrictions]** |
| §180.342 (a) | Chlorpyrifos and TCP. | §180.342 (a) | Chlorpyrifos *per se*. |
| §180.342 (b) | Chlorpyrifos and TCP [For regional registrations]. | §180.342 (b) | Chlorpyrifos *per se* [For regional registrations]. |
| §180.342 (c) | Chlorpyrifos *per se*. | | Delete §180.342 (c) and transfer all tolerances under this section to §180.342 (a) at their respective reassessed levels. |
| §180.342 (d) | Chlorpyrifos *per se* [For regional registrations]. | | Delete §180.342 (d) section since all tolerances under this section are to be revoked (no registered uses). |
| §180.342 (e) | Chlorpyrifos *per se* | | Delete §180.342 (e) and transfer all tolerances under this section to §180.342 (a) at their respective reassessed levels. |
| §180.342 (f) | Chlorpyrifos *per se* | | Delete §180.342 (f). This tolerance expired on 12/31/96. |
| §185.1000 (a) | Chlorpyrifos and TCP. | §185.342(a) | Chlorpyrifos *per se*. |
| §185.1000 (b) | [Provisions on safe use of chlorpyrifos on food-handling establishments]. | §185.1000(a) | Conditions for safe use of chlorpyrifos on food-handling establishments. Redesignate as §185.1000 (a). |
| §185.1000 (c) | Chlorpyrifos *per se* (tolerances established in food items [other than those already covered by a higher tolerance as a result of use on growing crops] in food-service establishments, as result of the application of Mcap form. | §185.1000(b) | Chlorpyrifos *per se*.<br><br>Redesignate as §185.1000 (b). |
| §185.1000 (d) | Chlorpyrifos *per se*. | | Delete §185.1000 (d) section and transfer all reassessed tolerances to §185.342(a). |
| §186.1000(a) | Chlorpyrifos and TCP. | §186.342(a) | Chlorpyrifos *per se*. |

Tolerances Listed Under 40 CFR §180.342(a)

The current raw agricultural commodity tolerances listed in 40 CFR §180.342(a) are expressed in terms of the combined residues of chlorpyrifos and its metabolite TCP. This tolerance definition should be amended to depict residues of chlorpyrifos *per se*. Refer to Table D for modifications in commodity definitions.

Adequate data are available to assess the established tolerances for: almonds, hulls; apples; beans, lima; beans, snap; beets, sugar, root; beets, sugar, tops; citrus fruits; corn, fresh (inc. sweet K-CWHR); cranberries; kiwifruit; onions; seed and pod vegetables; sorghum, grain; sorghum, fodder; sorghum, forage; and vegetables, leafy, *Brassica* (cole).

Adequate data depicting chlorpyrifos *per se* are available for the majority of commodities listed in 40 CFR §180.342(a). However, the field trial data submitted for sugar beets and nuts depict the combined residues of chlorpyrifos and TCP. In the absence of adequate data depicting chlorpyrifos *per se* on the commodities of these crops, the established tolerances, for tolerance reassessment purposes, should remain at the existing levels. It is the registrant's prerogative to petition the Agency and submit additional field residue data depicting chlorpyrifos *per se* in/on these crops if a tolerance-level reduction is desired.

Additional field residue data and/or label revisions are required for the following racs before a complete tolerance reassessment can be made: aspirated grain fractions of sorghum, soybeans, and wheat; cotton gin byproducts; almonds, filberts, pecans, walnuts; and wheat hay. Additional data are required (and tolerance proposals, if needed) for crops grown solely for seed (clover, and grasses). The following additional recommendations can be made:

The individual tolerances for lima beans and snap beans should be revoked since these commodities are covered by the established crop group tolerance for legume vegetables. The individual tolerances for lima bean forage and snap bean forage should be revoked since these commodities are not considered seed items (Table 1, OPPTS 860.1000).

The established tolerances for blueberry and mushroom should be revoked since there are no registered uses of chlorpyrifos on these crops.

The established crop group tolerance for "seed and pod vegetables" should be revoked since uses of chlorpyrifos on dill and okra, for which this obsolete crop group was supposed to cover, have been deleted.

The established crop group tolerance for "tree nuts" should be revoked because chlorpyrifos is just registered for use on almonds, filberts, macadamia nuts, pecans, and walnuts. Individual tolerances will be established for these nuts.

Additional data are required for aspirated grain fractions of sorghum.

The following petitions for the establishment of tolerances for residues of chlorpyrifos *per se* in/on various commodities and applications for amended use patterns, are pending:

**PP#1F2575**. This petition requests approval for using chlorpyrifos WP formulation on citrus. [Note: Data reviewed in the Residue Chemistry Science Chapter of the Chlorpyrifos Reregistration Standard reflect use of the EC formulation only]. Data

submitted with this petition indicate that the established tolerance of 1.0 ppm will not be exceeded following application of the WP and EC formulations according to the proposed use patterns; the maximum residue of chlorpyrifos *per se* was 0.64 ppm. In an evaluation (CBTS Nos. 12054 and 12055, DP Barcodes D192286 and D192287, 2/16/94, G. Otakie) of this petition, CBTS concluded that if the proposed labels are revised so that the minimum recommended spray volume for all the proposed uses is 100 gallons per acre, then CBTS would not object to approval of use of the chlorpyrifos WP formulations on citrus.

**PP#4F03132**. This petition proposes the establishment of a tolerance for residues of chlorpyrifos *per se* in/on lettuce. In an evaluation (CBTS No. 10797, DP Barcode D183887, 9/27/93, N. Dodd) of this petition, CBTS recommended for the establishment of a 1 ppm tolerance level.

**PP#3F02872/3H05393.** This petition proposes the establishment of tolerances for residues of chlorpyrifos *per se* in/on grapes and its processed commodities.

**PP#4F03008/1H5295**. This petition proposes the establishment of tolerances for residues of chlorpyrifos *per se* in/on tomatoes and its processed commodities in support of domestically grown tomatoes. In an evaluation (CBTS No. 10804, DP Barcode D183901, 9/27/93, N. Dodd) of this petition, CBTS recommended for the establishment of a 1.0 ppm tolerance level for tomatoes and a 65 ppm feed additive tolerance level for tomato pomace. However, tomato pomace is no longer considered a feed (Table 1, OPPTS 860.1000). [In June, 2000, chlorpyrifos registrants agreed to cancellation of hte use on tomatoes and concurrent revocation of the tomato tolerance.] This petition was revised to propose the establishment of tolerances for residues of chlorpyrifos *per se* in/on bean hay at 0.1 ppm, pea hay at 0.1 ppm, and soybean hay at 0.1 ppm. In an evaluation (CBRS No. 10903, D185266, 1/12/93, L. Cheng) of this petition, CBRS concluded that these proposed tolerances are appropriate. As a result of the revision of food and feed commodities listings (Table 1, OPPTS 860.1000), bean hay and pea hay are no longer considered feed items. Tolerances are not required. A tolerance is not need for soybean hay if the feeding restriction remains on the pertinent labels.

An additional revision to Section F of this petition (dated 6/2/94) added the following proposed chlorpyrifos tolerances to this petition: 0.5 ppm in/on corn grain dust, sorghum grain, and sorghum forage; 0.1 ppm in/on sunflower seed; 2.0 ppm in/on sorghum fodder; and 0.20 ppm in/on corn grain oil. CBRS recommended for these proposed tolerances (S.Knizner, CBRS #14150 and 14151, 8/15/94). As a result of changes in procedures for determining the need for food/feed additive tolerances, a tolerance is no longer required for corn grain milled fractions, and the appropriate food additive tolerance for corn oil is 0.25 ppm. Also, sunflower hulls are no longer a feed item (Table 1 860.1000). In another response to this petition, it was noted that a 0.5 ppm tolerance was recommended for corn aspirated grain fractions based on a concentration

factor of ~10x in the <420 $\mu$ dust fraction (see CBRS No. 11372, D188151, S. Knizner, 8/26/93). Additional data are required for sorghum, soybean, and wheat aspirated grain fractions before a tolerance for aspirated grain fractions can be established (see "Aspirated Grain Fractions 9Grain Dust): A Tolerance Perspective", E.Saito and E.Zager, 6/7/94.

**PP#3F4188/3H5662**. This petition proposes the establishment of tolerances for residues of chlorpyrifos *per se* in/on barley grain at 0.3 ppm, barley forage at 1.5 ppm, and barley straw at 1.5 ppm. This petition is currently in reject status (CBTS Nos. 11322, 11791, and 12180, DP Barcodes D187788, D190700, and D192629, 7/20/93, R. Lascola).

**PP#0E3910**. This petition proposes the establishment of a tolerance with regional registration for residues of chlorpyrifos *per se* in/on olives at 4.0 ppm. This petition is currently in reject status (CBTS Nos. 11645, DP Barcode D189607, 5/14/93, J. Garbus; and S. Bacchus memo of 3/8/91).

**PP#0E3920**. This petition proposes the establishment of a temporary tolerance for residues of chlorpyrifos *per se* in catfish at 0.5 ppm. This petition is currently in reject status.

Tolerances Listed Under 40 CFR §180.342(b)

The current raw agricultural commodity tolerances with regional registration listed in 40 CFR §180.342(b) are expressed in terms of the combined residues of chlorpyrifos and its metabolite TCP. This tolerance definition should be amended to reflect residues of chlorpyrifos *per se*. Furthermore, this 40 CFR §180.342(b) section should be retained for chlorpyrifos tolerances with regional registration, as defined in §180.1(n).

Label revision is required for asparagus before a complete tolerance reassessment can be made. The field trial data submitted for asparagus depict combined residues of chlorpyrifos and TCP. In the absence of adequate data depicting chlorpyrifos *per se* on asparagus, the established tolerance on this commodity, should remain at the existing levels. It is the registrant's prerogative to petition the Agency and submit additional field residue data depicting chlorpyrifos *per se* in/on asparagus if a tolerance-level reduction is desired.

The established tolerances for dates and leeks should be revoked since there are no registered uses of chlorpyrifos on these crops.

The established tolerance for grapes should be lowered from 0.5 ppm to 0.01 ppm to reflect the currently registered US use pattern. Chlorpyrifos registrants agreed to this action as part of risk mitigation in June, 2000.

Tolerances Listed Under 40 CFR §180.342(c)

The current raw agricultural commodity tolerances listed in 40 CFR §180.342(c) are expressed in terms of chlorpyrifos *per se*. All tolerances listed in this section should be transferred to §180.342 (a) at their respective reassessed levels and §180.342 (c) should then be deleted. Refer to Table D for modifications in commodity definitions.

Adequate data are available to assess the established tolerances for: alfalfa, forage; alfalfa, hay; bananas, whole; bananas, pulp with peel removed; broccoli; Brussels sprouts; cabbage; cattle, fat; cattle, meat; cattle, meat byproducts; cauliflower; Chinese cabbage; corn, field, grain; corn, forage; corn, fodder; cottonseed; cucumbers; eggs; figs; goats, fat; goats, meat; goats, meat byproducts; hogs, fat; hogs, meat; hogs, meat byproducts; horses, fat; horses, meat; horses, meat byproducts; legume vegetables, succulent or dried (except soybeans); milk, fat; milk, whole; mint; peanut hulls; peanuts; poultry, fat (inc. turkeys); poultry, meat (inc. turkeys); poultry, meat byproducts (inc. turkeys); pumpkins; radishes; rutabagas; sheep, fat; sheep, meat; sheep, meat byproducts; soybean grain; soybean forage; strawberries; sweet potatoes; turnip greens; turnips; wheat, forage; wheat, grain; and wheat, straw.

Additional field residue data and/or label revisions are required for cherries before a complete tolerance reassessment can be made. The following additional recommendations can be made:

The established tolerance for caneberries and sugarcane should be revoked since there are no registered uses of chlorpyrifos on caneberries (*Rubus* spp.) or sugarcane.

The individual tolerances for broccoli, Brussels sprouts, cabbage, Chinese cabbage, and cauliflower should be revoked since these commodities are covered by the crop group tolerance for the Brassica (cole) leafy vegetables group.

Additional data are required for aspirated grain fractions of soybean and wheat.

Tolerances Listed Under 40 CFR §180.342(d)

The current raw agricultural commodity tolerances with regional registration listed in 40 CFR §180.342(d) are expressed in terms of chlorpyrifos *per se*. The tolerances listed in this section were intended for crop commodities [cherimoya, feijoa (pineapple guava), and sapote] grown in CA. There are presently no registered chlorpyrifos uses on these crops. Therefore, these tolerances should be revoked, and the §180.342(d) section should be deleted.

Tolerances Listed Under 40 CFR §180.342(e)

The current raw agricultural commodity tolerances listed in 40 CFR §180.342(e) are expressed in terms of chlorpyrifos *per se*. The tolerances listed in this section (nectarines, peaches, pears and plums all at 0.05 ppm) reflect levels obtained in foreign crop field trials (see PP#4E04288 and PP#4E04289). However, there also are domestic registrations for these crops,

therefore, these tolerances should be moved to §180.342(a), and the §180.342(e) section should be deleted.

Tolerances Listed Under 40 CFR §180.342(f)

The current raw agricultural commodity tolerances listed in 40 CFR §180.342(f) are expressed in terms of chlorpyrifos *per se*. The tolerances listed in this section are for residues in/on oats and barley when blended together as a mixture and not containing more than 97% oats and not less than 3% barley. This tolerance expired on 12/31/96 and therefore should be revoked.

Tolerances Listed Under 40 CFR §185.1000(a)

The current food additive tolerances listed in 40 CFR §185.1000(a) are expressed in terms of the combined residues of chlorpyrifos and its metabolite TCP. This tolerance definition should be amended to depict residues of chlorpyrifos *per se*. Refer to Table D for modifications in commodity definitions. These tolerances should be moved to 40 CFR §185.342(a).

Adequate data, depicting residues of chlorpyrifos *per se*, are available to assess the established food additive tolerance for citrus oil. Based on revised procedures for determining the need for food/feed additive tolerances, a tolerance of 20 ppm is required for citrus oil.

CBRS has recommended that the registrant submit a petition proposing: (i) a tolerance of 0.25 ppm for residues of chlorpyrifos *per se* in corn, oil, refined; and (ii) a tolerance of 0.1 ppm for residues of chlorpyrifos *per se* in corn, milled fractions (grits, meal, and flour) (CBRS No. 11372, D188151, 8/26/93, S. Knizner). The registrant has revised Section F of PP#4F03008/1H5295 to reflect this recommendation, and CBRS has recommended for the tolerance revision (S.Knizner, CBRS #14150 and 14151, 8/15/94). Based on revisions in procedures for determining the magnitude of food/feed additive tolerances, the tolerance for chlorpyrifos *per se* in corn, oil, refined should be 0.20 ppm. No tolerance is required for corn, milled fractions.

Tolerances Listed Under 40 CFR §185.1000(b)

No numerical tolerances have been established for residues in food resulting from treatments of food-handling establishments. The available data are sufficient to determine that when registered formulations are used according to label directions, no detectable residues (<0.01-<0.025 ppm) are likely to occur in food items. The prescribed conditions for safe use of chlorpyrifos formulations in food-handling establishments, as outlined in 40 CFR §185.1000(b), are appropriate and should be retained, but this sections should be redesignated 40 CFR §185.1000(a).

Tolerances Listed Under 40 CFR §185.1000(c)

Sufficient data are available to ascertain the adequacy of the 0.1 ppm food additive tolerance for residues of chlorpyrifos *per se* in/on food items (other than those already covered by a higher tolerance as a result of use on growing crops), in food-service establishments where food and food products are prepared and served, as result of the application of the microencapsulated formulation. The prescribed conditions for safe use of the chlorpyrifos microencapsulated formulation in food-handling establishments, as outlined in 40 CFR §185.1000(c), are appropriate and should be retained, but this sections should be redesignated 40 CFR §185.1000(b).

Tolerances Listed Under 40 CFR §185.1000(d)

The food additive tolerances listed in 40 CFR §180.1000(d) are expressed in terms of chlorpyrifos *per se*. All tolerances listed in this section should be transferred to §180.342(a) at their respective reassessed levels and §180.1000(d) should be deleted. Refer to Table D for modifications in commodity definitions.

Adequate data are available to assess the established tolerances for: wheat, milled fractions; mint, oil; and peanut, oil, refined. Table 1 (OPPTS 860.1000) now has separate entries for peppermint and spearmint oil; mint oil has been deleted.

Tolerances Listed Under 40 CFR §186.1000(a)

The current feed additive tolerances listed in 40 CFR §186.1000(a) are expressed in terms of the combined residues of chlorpyrifos and its metabolite TCP. This tolerance definition should be amended to depict residues of chlorpyrifos *per se*. Refer to Table D for modifications in commodity definitions. These tolerances should be moved to 40 CFR §185.342(a).

Adequate data are available to assess the established tolerances for: apple, pomace, dried; beet, sugar, molasses; and beets, sugar, pulp (dried).

Note that Table 1 (OPPTS 860.1000) no longer includes dried apple pomace as an animal feed item; only wet apple pomace is included. Therefore, the tolerance for dried apple pomace should be revoked using the revised procedures for determining the need for feed additive tolerances, it is concluded that a wet apple pomace tolerance of 3.0 ppm is appropriate. Additionally, Table 1 (OPPTS 860.1000), no longer requires tolerances for sorghum milling fractions. Sorghum flour is used exclusively in the US as a component of drywall, not as either a human or animal feed. Therefore, the tolerance for sorghum milling fractions should be revoked.

The available processing data for apples and sugar beets depict combined residues of chlorpyrifos and TCP. In the absence of adequate data depicting chlorpyrifos *per se* on the processed commodities of these crops, the established feed additive tolerances, for tolerance reassessment purposes, should remain at the existing levels. It is the registrant's prerogative to petition the Agency and submit additional processing data depicting chlorpyrifos *per se* in/on these commodities if tolerance-level reductions or lower anticipated residue calculations are

desired.

Also, tolerances are no longer required for citrus pulp, corn soapstock, grape pomace and sunflower hulls.

## Table D. Tolerance Reassessment Summary.

| Commodity | Current Tolerance (ppm) | Tolerance Reassessment (ppm) | [*Correct Commodity Definition*]/ Comments |
|---|---|---|---|
| **Tolerances Listed Under 40 CFR §180.342(a)** | | | |
| Almonds | 0.2 | 0.2 | [*Almond*]. |
| Almonds, hulls | 12.0 | 12.0 | [*Almond, hulls*]. |
| Apples | 1.5 | 0.01 | [*Apple*]. |
| Beans, lima | 0.05 | Revoke | Covered by legume vegetables group. |
| Beans, lima, forage | 1.0 | Revoke | Not a food/feed item. |
| Beans, snap | 0.05 | Revoke | Covered by legume vegetables group. |
| Beans, snap, forage | 1.0 | Revoke | Not a food/feed item. |
| Beets, sugar, root | 1.0 | 1.0 | [*Beet, sugar, root*]. |
| Beets, sugar, tops | 8.0 | 8.0 | [*Beet, sugar, tops*]. |
| Blueberry | 2 (1) [a] | Revoke | No registered uses exist. |
| Citrus fruits | 1.0 | 1.0 | [*Citrus fruits group*]. |
| Corn, fresh (inc. sweet K-CWHR) | 0.1 | 0.05 | [*Corn, sweet (K + CWHR)*]. |
| Cranberries | 1.0 | 1.0 | [*Cranberry*]. |
| Kiwifruit | 2.0 | 2.0 | |
| Mushrooms | 0.1 | Revoke | No registered uses exist. |
| Onions (dry bulbs) | 0.5 | 0.5 | [*Onion, bulb)*]. |
| Peppers | 1.0 | 1.0 | [*Pepper*]. Chlorpyrifos labels from foreign countries that import peppers to the U.S. are required. |
| Seed and pod vegetables | 0.1 | Revoke | Uses of chlorpyrifos on dill and okra, for which this obsolete crop group was supposed to cover, have been deleted. |
| Sorghum, fodder | 6.0 | 2.0 | [*Sorghum, grain, fodder*]. Recommended tolerance from PP#4F3008/FAP#1H5295. |
| Sorghum, forage | 1.5 | 0.5 | [*Sorghum, grain, forage*]. |
| Sorghum, grain | 0.75 | 0.5 | |
| Sunflower seeds | 0.25 | 0.1 | [*Sunflower, seed*]. Recommended tolerance from PP#4F3008/FAP#1H5295. |
| Tomatoes | 0.5 | Revoke | As part of risk mitigation, chlorpyrifos registrants have agreed to cancel use on tomatoes. |
| Tree nuts | 0.2 | Revoke | Individual tolerances are being reassessed for all almond, filbert, pecan, walnut and macadamia nut. |
| Vegetables, leafy, *Brassica* (cole) | 2.0 (1.0) [a] | 1 | [*Brassica (cole) leafy vegetables group*]. |
| Walnuts | 0.2 | 0.2 | [*Walnut*]. |

Table D *(continued).*

| Commodity | Current Tolerance (ppm) | Tolerance Reassessment (ppm) | [*Correct Commodity Definition*]/ Comments |
|---|---|---|---|
| ***Additional Tolerances Required Under 40 CFR §180.342(a)*** | | | |
| *Aspirated grain fractions* | *None* | *TBD* | *A 0.5 ppm tolerance was recommended for corn aspirated grain fractions based on a concentration factor of ~10x in the <420 μ dust fraction (see CBRS No. 11372, D188151, S. Knizner, 8/26/93). Additional data are required for sorghum, soybean, and wheat aspirated grain fractions before a tolerance for aspirated grain fractions can be established (see "Aspirated Grain Fractions (Grain Dust): A Tolerance Perspective", E.Saito and E.Zager, 6/7/94.* |
| *Clover, forage* | *None* | *TBD* | |
| *Clover, hay* | *None* | *TBD* | |
| *Cotton, gin byproducts* | *None* | *TBD* | |
| *Filbert* | *None* | *0.2* | |
| *Grass, forage* | *None* | *TBD* | |
| *Grass, hay* | *None* | *TBD* | |
| *Grass, seed screenings* | *None* | *TBD* | |
| *Lettuce* | *None* | *1* | *Recommended tolerance from PP#4F03132.* |
| *Macadamia nut* | *None* | *0.2* | |
| *Pecan* | *None* | *0.2* | |
| *Peppermint, tops* | *None* | *0.8* | |
| *Spearmint, tops* | *None* | *0.8* | |
| *Wheat, hay* | *None* | *TBD* | |
| ***Tolerances Listed Under 40 CFR §180.342(b)*** | | | |
| *Asparagus* | *5.0* | *5.0* | *Label revision is required.* |
| *Dates* | *0.5 (0.3)* [a] | *Revoke* | *No registered uses exist.* |
| *Grapes* | *0.5* | *0.01* | *Tolerance based on currently registered US use pattern.* |
| *Leeks* | *0.5 (0.2)* [a] | *Revoke* | *No registered uses exist.* |
| ***Tolerances Listed Under 40 CFR §180.342(c)*** | | | |
| *Alfalfa, forage* | *3* | *3* | |
| *Alfalfa, hay* | *13* | *13* | |
| *Bananas, whole* | *0.1* | *0.1* | |
| *Bananas, pulp with peel removed* | *0.01* | *0.01* | |
| *Bean, forage* | *0.7* | *Revoke* | *Not a feed item Table 1 (OPPTS 860.1000)* |
| *Broccoli* | *1* | *Revoke* | *Covered by Brassica (cole) leafy vegetables group.* |

Table D *(continued).*

| Commodity | Current Tolerance (ppm) | Tolerance Reassessment (ppm) | [*Correct Commodity Definition*]/ Comments |
|---|---|---|---|
| *Brussels sprouts* | *1* | *Revoke* | *Covered by Brassica (cole) leafy vegetables group.* |
| *Cabbage* | *1* | *Revoke* | *Covered by Brassica (cole) leafy vegetables group.* |
| *Caneberries* | *1.0* | *Revoke* | *No registered uses exist.* |
| *Cattle, fat* | *0.3* | *0.3* | |
| *Cattle, meat* | *0.05* | *0.05* | |
| *Cattle, meat byproducts* | *0.05* | *0.05* | |
| *Cauliflower* | *1* | *Revoke* | *Covered by Brassica (cole) leafy vegetables group.* |
| *Cherries* | *1* | *TBD* | *Additional data and/or label revisions are required.* |
| *Chinese cabbage* | *1* | *Revoke* | *Covered by Brassica (cole) leafy vegetables group.* |
| *Corn, field, grain* | *0.05* | *0.05* | |
| *Corn, forage* | *8* | *8* | |
| *Corn, fodder* | *8* | *8* | |
| *Cottonseed* | *0.2* | *0.2* | |
| *Cucumbers* | *0.05* | *0.05* | |
| *Eggs* | *0.01* | *0.01* | |
| *Figs* | *0.01* | *0.01* | |
| *Goats, fat* | *0.2* | *0.2* | |
| *Goats, meat* | *0.05* | *0.05* | |
| *Goats, meat byproducts* | *0.05* | *0.05* | |
| *Hogs, fat* | *0.2* | *0.2* | |
| *Hogs, meat* | *0.05* | *0.05* | |
| *Hogs, meat byproducts* | *0.05* | *0.05* | |
| *Horses, fat* | *0.25* | *0.25* | |
| *Horses, meat* | *0.25* | *0.25* | |
| *Horses, meat byproducts* | *0.25* | *0.25* | |
| *Legume vegetables, succulent or dried (except soybeans)* | *0.05* | *0.05* | *[Legume vegetables (succulent or dried) group (except soybeans)].* |
| *Milk, fat* | *0.25* | *0.25* | *[Milk fat (reflecting 0.01 ppm in whole milk)]/ Recommended tolerance from PP#3F2884.* |
| *Milk, whole* | *0.01* | *Revoke* | *Covered by tolerance from milk fat (reflecting 0.01 ppm in whole milk).* |
| *Mint, hay* | *0.8* | *Revoke* | *Separate tolerances for peppermint tops and spearmint tops need to be established.* |

Table D *(continued).*

| Commodity | Current Tolerance (ppm) | Tolerance Reassessment (ppm) | [*Correct Commodity Definition*]/ Comments |
|---|---|---|---|
| *Nectarines* | *0.05* | *0.05* | |
| *Peaches* | *0.05* | *0.05* | |
| *Pea forage* | *0.7* | *Revoke* | *Not a feed item (Table 1, OPPTS 860.1000)* |
| *Peanut hulls* | *2* | *Revoke* | *Not a feed item (Table 1, OPPTS 860.1000)* |
| *Peanuts* | *0.2* | *0.2* | *[Peanuts, nutmeat].* |
| *Pears* | *0.05* | *0.05* | |
| *Plums (fresh prunes)* | *0.05* | *0.05* | *[Plums]* |
| *Poultry, fat (inc. turkeys)* | *0.1* | *0.1* | |
| *Poultry, meat (inc. turkeys)* | *0.1* | *0.1* | |
| *Poultry, meat byproducts (inc. turkeys)* | *0.1* | *0.1* | |
| *Pumpkins* | *0.05* | *0.05* | *[Pumpkin].* |
| *Radishes* | *2* | *2* | *[Radish].* |
| *Rutabagas* | *0.5* | *0.5* | *[Rutabagas, root].* |
| *Sheep, fat* | *0.2* | *0.2* | |
| *Sheep, meat* | *0.05* | *0.05* | |
| *Sheep, meat byproducts* | *0.05* | *0.05* | |
| *Soybean grain* | *0.3* | *0.3* | *[Soybean, seed].* |
| *Soybean forage* | *0.7* | *Revoke* | *Feeding may be restricted on the label.* |
| *Strawberries* | *0.2* | *0.2* | *[Strawberry].* |
| *Sugarcane* | *0.01* | *Revoke* | *No registered uses exist.* |
| *Sweet potatoes* | *0.05* | *0.05* | *[Sweet potato, root].* |
| *Turnip greens* | *0.3* | *0.3* | *[Turnip, tops].* |
| *Turnips* | *1* | *1* | *[Turnip, root].* |
| *Wheat, forage* | *3* | *3* | |
| *Wheat, grain* | *0.5* | *0.5* | |
| *Wheat, straw* | *6* | *6* | |
| ***Tolerances Listed Under 40 CFR §180.342(d)*** | | | |
| *Cherimoya* | *0.05* | *Revoke* | *No registered uses exist.* |
| *Feijoa (pineapple guava)* | *0.05* | *Revoke* | *No registered uses exist.* |
| *Sapote* | *0.05* | *Revoke* | *No registered uses exist.* |
| ***Tolerances Listed Under 40 CFR §180.342(e)*** | | | |
| Oats (97%) and Barley (3%) Mixture | 15 | Revoke | Tolerance expired 12/31/96. |

Table D *(continued).*

| Commodity | Current Tolerance (ppm) | Tolerance Reassessment (ppm) | [*Correct Commodity Definition*]/ Comments |
|---|---|---|---|
| **Tolerances Listed Under 40 CFR §185.1000(a)** | | | |
| Citrus oil | 25.0 | 20 | Move to 40 CFR §185.342(a) |
| Corn oil | 3.0 | 0.25 | [*Corn, oil, refined*]/ Recommended tolerance based on a average concentration factor of 3.3x (see CBRS No. 11372, D188151, S. Knizner, 8/26/93). Move to 40 CFR §185.342(a) |
| **Tolerances Listed Under 40 CFR §185.1000(d)** | | | |
| Milling fractions (except flour) of wheat | 1.5 | Revoke | Wheat tolerance for wheat (0.5 ppm) will cover processed milling fractions under the revised procedures for the determination of need for food additive tolerances. |
| Peanut oil | 0.4 | 0.2 | Revised procedures for calculating food additive tolerance values. (HAFT (0.11) x average processing factor (1.7)). Move to 40 CFR §185.342(a) |
| Mint oil | 8 | Revoke | Tolerances should be established for peppermint and spearmint oil. |
| **Tolerances Listed Under 40 CFR §186.1000(a)** | | | |
| Apple pomace, dried | 12.0 | Revoke | Revoke. According to Table 1 (OPPTS, 860.1000) dried apple pomace is no longer an animal feed, establish tolerance for wet apple pomace instead (see below). |
| Beets, sugar, molasses | 15.0 | 15.0 | [*Sugar beet, molasses*]. Move to 40 CFR §185.342(a) |
| Beets, sugar, pulp (dried) | 5.0 | 5.0 | [*Sugar beet, pulp, dehydrated*]. Move to 40 CFR §185.342(a) |
| Citrus pulp, dried | 5.0 | 5.0 | [*Citrus, dried, pulp*]. Move to 40 CFR §185.342(a) |
| Corn soapstock | 1.0 | Revoke | Not a feed item (Table 1, OPPTS 860.1000). |
| Grape, pomace, dried | 2.0 | Revoke | Not a feed item (Table 1, OPPTS 860.1000). |
| Sorghum milling fractions | 1.5 | Revoke | Revoke. According to Table 1, OPPTS Test Guidelines 860, August 1996, sorghum flour is used exclusively in the US as a component for drywall, not as either a human or animal feed item. |
| Sunflower seed hulls | 0.5 | Revoke | Not a feed item (Table 1, OPPTS 860.1000). |
| **Additional Tolerance Required Under 40 CFR §186.342(a)** | | | |
| Apple, pomace, wet | None | 0.02 | Reassessed tolerance (0.01 ppm) and average concentration factor (2.1). |
| Peppermint oil | None | 8 | |
| Spearmint oil | none | 8 | |

[a] The maximum amount of chlorpyrifos *per se* allowed in this commodity is in parentheses.

[b] TBD = To be determined. Reassessment of tolerance(s) cannot be made at this time because either additional data or label revisions are required.

## D. CODEX HARMONIZATION

Residue data used to establish US tolerances were examined to determine if US tolerance levels could be adjusted to harmonize with Codex MRLs. Whenever possible, tolerance levels were changed to achieve harmonization.

Several maximum residue limits (MRLs) for chlorpyrifos have been established by Codex in various commodities; see Table E. The Codex MRLs (expressed in terms of chlorpyrifos *per se*) and the U.S. tolerance expression will be compatible when TCP is deleted from the U.S. tolerance expressions.

Compatibility between the U.S. tolerances and Codex MRLs exists for cabbage, Chinese; kale [Brassica (cole) leafy vegetables group]; kiwifruits; milks; and poultry meat. Further harmonization of U.S. tolerances and Codex MRLs on other commodities are not feasible at this time. US tolerances are based on domestic use patterns supported by domestic field trial data. Codex MRLs may differ from US tolerances because of different use patterns in foreign countries.

**Table E. Codex MRLs and Applicable U.S. Tolerances.**

| Commodity | MRL (mg/kg) [a] | U.S. Tolerance (ppm) [b] | Recommendation/ Comments |
|---|---|---|---|
| Apple | 1 | 0.01 | -- |
| Cabbages, head | 0.05 [c] | 1 | -- |
| Carrot | 0.5 | None | -- |
| Cattle meat | 2 (fat) | 0.05 | -- |
| Cauliflower | 0.05 [c] | 1 | -- |
| Celery | 0.05 [c] | None | -- |
| Chicken meat | 0.1 (fat) | 0.1 | Compatibility exists. |
| Chinese cabbage, type "Pe-tsai" | 1 | 1 | Compatibility exists. |
| Citrus fruits | 0.3 | 1.0 | -- |
| Common bean (pods and/or immature seeds) | 0.2 | 0.05 (Legume vegetables group, except soybeans) | -- |
| Cottonseed | 0.05 [c] | 0.2 | -- |
| Cotton seed oil, crude | 0.05 [c] | None | -- |
| Dried grapes | 2 | 0.5 | Recommend increase to 1.0. |
| Eggplant | 0.2 | None | -- |
| Eggs | 0.05 [c] | 0.01 | -- |
| Grapes | 1 | 0.01 | |

Table E (*continued*).

| Commodity | MRL (mg/kg) [a] | U.S. Tolerance (ppm) [b] | Recommendation/ Comments |
|---|---|---|---|
| Kale | 1 | 1 (Brassica (cole) leafy vegetables group) | Compatibility exists. |
| Kiwifruit | 2 | 2.0 | Compatibility exists. |
| Lettuce, head | 0.1 | 1 (proposed) | -- |
| Milk | 0.01 [c] | 0.01 | Compatibility exists. |
| Mushrooms | 0.05 [c] | Revoke | No registered US use. |
| Onion, bulb | 0.05 [c] | 0.5 | -- |
| Pear | 0.5 | 0.05 | -- |
| Peppers | 0.5 | 1.0 | -- |
| Potato | 0.05 [c] | None | -- |
| Raspberries, red, black | 0.2 | 1.0 (caneberries) | -- |
| Rice | 0.1 | None | -- |
| Sheep meat | 0.2 (fat) | 0.05 | -- |
| Sugar beet | 0.05 [c] | Revoke | No registered US use. |
| Tomato | 0.5 | Revoke | Use in US canceled. |
| Turkey meat | 0.2 (fat) | 0.1 (poultry meat, including turkeys) | -- |

[a] All chlorpyrifos MRLs are final (CXL).
[b] Based on chlorpyrifos *per se*.
[c] At or about the limit of detection.

## 6.0 DATA GAPS

**6.1. Product Chemistry** Forty (40) MP's have been identified. Guideline 830.6314 data requirements remain outstanding for the DowElanco 99% T. Data remain outstanding for all other chlorpyrifos MPs; for many MPs no product chemistry data have been submitted. Provided that the registrants submit the data required in the attached summary tables for the chlorpyrifos MPs, and either certify that the suppliers of starting materials and the manufacturing processes for the chlorpyrifos technicals and manufacturing-use products have not changed since the last comprehensive product chemistry review or submit complete updated product chemistry data packages, HED has no objections to the reregistration of chlorpyrifos with respect to product chemistry data requirements.

**6.2. Residue Chemistry** The following confirmatory data requirements and/or label revisions for magnitude of the residue in plants (Guideline 860.1500) remain outstanding or are now required:

" For asparagus, no additional residue data are required. However, a label revision is needed. The maximum equivalent rate of 1.9 lb ai/A specified by a homeowner-use label (EPA Reg. No. 62719-56) should be adjusted to reflect the maximum registered rate of 1.0 lb ai/A for which adequate residue data are available. In a letter to the Agency dated 5/8/95 the registrant committed to correcting the label directions to 1.0 lb ai/A at the next label printing.

" For corn, label restrictions prohibiting feeding of silage, forage, or fodder to meat or dairy animals are not practical and must be removed from SLN DE930004 and FL940003 labels. Additional data must be submitted to determine if established tolerances on corn forage and fodder are adequate for these uses. Alternatively, these SLN uses may be canceled.

" For cotton, feeding restrictions for gin trash (gin by-products) are not practical and must be removed from product labels. Appropriate tolerances for cotton gin by-products must be proposed. The proposal must be supported by adequate residue data conducted according to the maximum use patterns.

" For crops grown solely for seed (clover, and grasses), tolerance proposals and adequate field residue data are required to support SLN (Section 24-c) uses. The Oregon Clover Association has indicated that it will support chlorpyrifos SLN (OR850032) use on clover grown for seed. The requirements specified in the Addendum to the Chlorpyrifos SRR remain outstanding. For grasses grown for seed, appropriate tolerances for residues of chlorpyrifos *per se* in/on grass forage and hay must be proposed. The proposal must be supported by adequate residue data conducted according to the maximum use patterns specified by NV940002, and OR94032. Alternatively, these SLN uses may be canceled.

" For peppers, the requirements specified by the Addendum to the Chlorpyrifos SRR to submit English translations of labels for all products that permit use of chlorpyrifos on peppers imported to the U.S. have not been fulfilled. Chlorpyrifos use on peppers was approved at the issuance of the SRR, SLN (FL920007, FL920009, GA930003, and GA930004).

" For sorghum, soybeans, and wheat, data are required for aspirated grain fractions.

" For the tree nuts group (almonds, filberts, macadamia nuts, pecans, and walnuts), the Addendum to the Chlorpyrifos SRR did not require additional data to support the established crop group tolerance. However, recently amended labels for the 4 lb/gal EC formulation (EPA Reg. Nos. 62719-23 and 62719-220)

indicated that a maximum seasonal rate of 10 lb ai/A was inadvertently approved for pecans. The available residue data, reflecting combined residues of chlorpyrifos and TCP in/on pecans and other representative members of this crop group, only support a maximum seasonal rate of 5 lb ai/A. If the registrant wishes to support a seasonal rate of 10 lb ai/A, then additional data are required. Alternatively, the labels for pecans may be revised to reflect a maximum seasonal rate of 5 lb ai/A. In a letter to the Agency dated 5/8/95, DowElanco stated that they would modify labels to reflect a maximal seasonal use rate of 5 lb ai/A for pecans at the next label printing. The latest approved label for Lorsban 4E (EPA Reg. No. 62719-220), dated 4/8/96 did not include this modification. The labels should be revised or appropriate residue data supplied. Because chlorpyrifos labels permit application only to almonds, filberts, pecans, walnuts, (all foliar applications) and macadamia nuts (only trunk spray {bark} application, SLN HI HI930010 and HI930011), DowAgrosciences has requested that only these nuts be considered in the dietary exposure assessment. HED has no objections to this request based on revocation of the crop group tolerance and establishment of individual tolerances for the aforementioned nuts.

GLN 860.1520: Magnitude of the Residue in Processed Food/Feed

According to Table 1 (August 1996) OPPTS 860.1000 Test Guidelines residue data for sorghum flour are not needed at this time because it is used exclusively as a component of drywall, and not as a food or animal feed item, in the US. However, because 50% of the worldwide sorghum production is used for human consumption, data may be needed at a later time.

The requirements for processing data on alfalfa meal are waived because residue data indicate that levels of chlorpyrifos *per se* are not likely to exceed the established tolerance in alfalfa hay following tests conducted according to registered uses. In addition, no sweet corn processing data are required since adequate corn forage data are available.

The available processing data for sugar beets depict combined residues of chlorpyrifos and TCP. In the absence of adequate data depicting chlorpyrifos *per se* on the processed commodities of these crops, the established feed additive tolerances, for tolerance reassessment purposes, should remain at the existing levels. It is the registrant's prerogative to petition the Agency and submit additional processing data depicting chlorpyrifos *per se* in/on these commodities if tolerance-level reductions or lower anticipated residue calculations are desired.

For wet apple pomace, the tolerance has been reassessed at 0.02 ppm, based on the reassessed tolerance for apples (0.01 ppm) and an average concentration factor of 2.1X.

GLNs 860.1850 and 860.1900: Confined/Field Rotational Crops

Provided that Dow AgroSciences modifies all labels for its chlorpyrifos containing products to

limit application to 5 lb ai/A/season on those crops where rotation to another crop could occur (as was stated in their letter to the Agency dated 8/12/94), HED will not require field rotational crop studies. Furthermore, a 30 day plant back interval for rotational crops would then be appropriate.

## APPENDIX I

Case No. 0100
Chemical No. 059101
Case Name: Chlorpyrifos
Registrant: DowElanco
Product(s): 99% T (EPA Reg. No. 62719-44)

## PRODUCT CHEMISTRY DATA SUMMARY

| Guideline Number | Requirement | Are Data Requirements Fulfilled? [a] | MRID Number [b] |
|---|---|---|---|
| 61-1 | Product Identity and Disclosure of Ingredients | Y | **00146508** |
| 61-2 | Starting Materials and Manufacturing Process | Y | **00146508** 40105301 |
| 61-3 | Discussion of Formation of Impurities | Y | **00146508** 40411301 42495401 [c] |
| 62-1 | Preliminary Analysis | Y | **00146508** |
| 62-2 | Certification of Ingredient Limits | Y | **00146508** |
| 62-3 | Analytical Methods to Verify the Certified Limits | Y | **00146508** |
| 63-2 | Color | Y | **00146508** |
| 63-3 | Physical State | Y | **00146508** |
| 63-4 | Odor | Y | **00146508** |
| 63-5 | Melting Point | Y | **00146508** |
| 63-6 | Boiling Point | N/A [d] | |
| 63-7 | Density, Bulk Density or Specific Gravity | Y | **00146508** 42495402 [c] |
| 63-8 | Solubility | Y | **00146508** |
| 63-9 | Vapor Pressure | Y | **00146508** |
| 63-10 | Dissociation Constant | N/A [e] | |
| 63-11 | Octanol/Water Partition Coefficient | Y | **00146508** 42652601 [c] |
| 63-12 | pH | N/A [f] | |
| 63-13 | Stability | Y | **00146508** |
| 63-14 | Oxidizing or Reducing Action | Y | **43428701**[j] |
| 63-15 | Flammability | N/A [d] | |
| 63-16 | Explodability | Y | 403046602[g] |
| 63-17 | Storage Stability | Y | **00146508**, 41742704[g] |
| 63-18 | Viscosity | N/A [d] | |
| 63-19 | Miscibility | N/A [d] | |
| 63-20 | Corrosion Characteristics | Y | **00146508** 41653503 [h] 42527201 [i] |

[a] Y = Yes; N = No; N/A = Not Applicable.
[b] **Bolded** references were reviewed under CBRS No. 947, dated 9/11/85, by S. Malak and were re-evaluated in the Chlorpyrifos SRR dated 11/18/88; underlined references were reviewed in the Chlorpyrifos SRR dated 11/18/88; all other references were reviewed as noted.
[c] CBRS No. 11373, D188150, dated 8/3/93, by K. Dockter.
[d] Data are not required because the TGAI/MP is a solid.
[e] Data pertaining to dissociation constant are not required because the TGAI/PAI does not dissociate.
[f] Data pertaining to pH are not required because the TGAI/MP is not dispersible in water.
[g] CBRS No. 14125 and 14126, D206232 and D206236, dated 8/12/94, by S. Knizner.
[h] CBRS No. 7368, D158705, dated 1/24/92, by C. Olinger.
[i] CBRS No. 10813, D184265, dated 2/1/93, by F. Toghrol.
[j] CBRS No. 14910, D210656, dated 02/13/95, by K. Dockter.

Case No. 0100
Chemical No. 059101
Case Name: Chlorpyrifos
Registrant: DowElanco
Product(s): 97% T (EPA Reg. No. 62719-15)

## PRODUCT CHEMISTRY DATA SUMMARY

| Guideline Number | Requirement | Are Data Requirements Fulfilled? [a] | MRID Number [b] |
|---|---|---|---|
| 61-1 | Product Identity and Disclosure of Ingredients | Y | **00146506** |
| 61-2 | Starting Materials and Manufacturing Process | Y | **00146506** 40411301, 40105301 |
| 61-3 | Discussion of Formation of Impurities | Y | **00146506** 40105301 42495401 [c] |
| 62-1 | Preliminary Analysis | Y | **00146506** 40144101 42544901 [d] |
| 62-2 | Certification of Ingredient Limits | Y | **00146506** 40105301 |
| 62-3 | Analytical Methods to Verify the Certified Limits | Y | **00146506** 40144101 |
| 63-2 | Color | Y | **00146506** |
| 63-3 | Physical State | Y | **00146506** |
| 63-4 | Odor | Y | **00146506** |
| 63-5 | Melting Point | Y | **00146506** |
| 63-6 | Boiling Point | N/A [e] | |
| 63-7 | Density, Bulk Density or Specific Gravity | Y | **00146506** 42495402 [c] |
| 63-8 | Solubility | Y | **00146506** |
| 63-9 | Vapor Pressure | Y | **00146506** |
| 63-10 | Dissociation Constant | N/A [f] | |
| 63-11 | Octanol/Water Partition Coefficient | Y | **00146506** 42652601 [c] |
| 63-12 | pH | N/A [g] | |
| 63-13 | Stability | Y | **00146506** |
| 63-14 | Oxidizing or Reducing Action | Y | 41742705[h] |
| 63-15 | Flammability | N/A [e] | |
| 63-16 | Explodability | Y | **00146506** |
| 63-17 | Storage Stability | Y | **00146506** |
| 63-18 | Viscosity | N/A [e] | |
| 63-19 | Miscibility | N/A [e] | |
| 63-20 | Corrosion Characteristics | Y | **00146506** |

[a] Y = Yes; N = No; N/A = Not Applicable.
[b] **Bolded** references were reviewed under CBRS No. 952, dated 7/30/85, by G. Makhijani and were re-evaluated in the Chlorpyrifos SRR dated 11/18/88; underlined references were reviewed in the Chlorpyrifos SRR dated 11/18/88; all other references were reviewed as noted.
[c] CBRS No. 11373, D188150, dated 8/3/93, by K. Dockter.
[d] CBRS No. 11403, D188256, 6/16/93, S. Funk.
[e] Data are not required because the TGAI/MP is a solid.
[f] Data pertaining to dissociation constant are not required because the TGAI/PAI does not dissociate.
[g] Data pertaining to pH are not required because the TGAI/MP is not dispersible in water.
[h] CBRS No. 14125 and 14126, D206232 and D206236, dated 8/12/94, by S. Knizner.

Case No. 0100
Chemical No. 059101

Case Name: Chlorpyrifos
Registrant: DowElanco
Product(s): 62.5% FI (EPA Reg. No. 62719-66)

## PRODUCT CHEMISTRY DATA SUMMARY

| Guideline Number | Requirement | Are Data Requirements Fulfilled? [a] | MRID Number [b] |
|---|---|---|---|
| 61-1 | Product Identity and Disclosure of Ingredients | Y | 00146513 |
| 61-2 | Starting Materials and Manufacturing Process | Y | 00146513 |
| 61-3 | Discussion of Formation of Impurities | N [c] | 00146513 |
| 62-1 | Preliminary Analysis | N/A [d] | 00146513 |
| 62-2 | Certification of Ingredient Limits | Y | 00146513 |
| 62-3 | Analytical Methods to Verify the Certified Limits | Y | 00146513 |
| 63-2 | Color | Y | 00146513 |
| 63-3 | Physical State | Y | 00146513 |
| 63-4 | Odor | Y | 00146513 |
| 63-5 | Melting Point | N/A [d] | |
| 63-6 | Boiling Point | N/A [d] | |
| 63-7 | Density, Bulk Density or Specific Gravity | Y | 00146513 |
| 63-8 | Solubility | N/A [d] | |
| 63-9 | Vapor Pressure | N/A [d] | |
| 63-10 | Dissociation Constant | N/A [d] | |
| 63-11 | Octanol/Water Partition Coefficient | N/A [d] | |
| 63-12 | pH | N [e] | |
| 63-13 | Stability | N/A [d] | |
| 63-14 | Oxidizing or Reducing Action | N | |
| 63-15 | Flammability | Y | 00146513 |
| 63-16 | Explodability | N | |
| 63-17 | Storage Stability | N [f] | 00146513 |
| 63-18 | Viscosity | Y | 00146513 |
| 63-19 | Miscibility | N [g] | |
| 63-20 | Corrosion Characteristics | N [f] | 00146513 |

[a] Y = Yes; N = No; N/A = Not Applicable.
[b] All references were reviewed under CBRS No. 931, dated 9/11/85, by S. Malak and were re-evaluated in the Chlorpyrifos SRR dated 11/18/88.
[c] These data do not fully satisfy the requirements of 40 CFR §158.167 (Guideline Reference No. 61-3) regarding discussion of formation of impurities because a discussion of possible post-production reactions between any of the product's active ingredients and any other component of the product or its packaging, and possible contamination from packaging materials or production equipment is required.
[d] Data are not required; this requirement will be fulfilled by the technical source product.
[e] Data pertaining to pH are required if the MP is dispersible in water.
[f] New data must be submitted for this requirement.
[g] Data pertaining to miscibility are required if the MP is an emulsifiable liquid which is to be diluted with petroleum solvents.

Case No. 0100
Chemical No. 059101
Case Name: Chlorpyrifos
Registrant: DowElanco
Product(s): 30% FI (EPA Reg. No. 62719-45)

## PRODUCT CHEMISTRY DATA SUMMARY

| Guideline Number | Requirement | Are Data Requirements Fulfilled? [a] | MRID Number [b] |
|---|---|---|---|
| 61-1 | Product Identity and Disclosure of Ingredients | N [c] | 00146512 |
| 61-2 | Starting Materials and Manufacturing Process | Y | 00146512 |
| 61-3 | Discussion of Formation of Impurities | N [d] | 00146512 |
| 62-1 | Preliminary Analysis | N/A [e] | 00146512 |
| 62-2 | Certification of Ingredient Limits | Y | 00146512 |
| 62-3 | Analytical Methods to Verify the Certified Limits | Y | 00146512 |
| 63-2 | Color | Y | 00146512 |
| 63-3 | Physical State | Y | 00146512 |
| 63-4 | Odor | Y | 00146512 |
| 63-5 | Melting Point | N/A [e] | |
| 63-6 | Boiling Point | N/A [e] | |
| 63-7 | Density, Bulk Density or Specific Gravity | N [f] | 00146512 |
| 63-8 | Solubility | N/A [e] | |
| 63-9 | Vapor Pressure | N/A [e] | |
| 63-10 | Dissociation Constant | N/A [e] | |
| 63-11 | Octanol/Water Partition Coefficient | N/A [e] | |
| 63-12 | pH | Y | 00146512 |
| 63-13 | Stability | N/A [e] | |
| 63-14 | Oxidizing or Reducing Action | N | |
| 63-15 | Flammability | Y | 00146512 |
| 63-16 | Explodability | N | |
| 63-17 | Storage Stability | N [g] | 00146512 |
| 63-18 | Viscosity | Y | 00146512 |
| 63-19 | Miscibility | Y | 00146512 |
| 63-20 | Corrosion Characteristics | N [h] | 00146512 |

[a] Y = Yes; N = No; N/A = Not Applicable.
[b] All references were reviewed under CBRS No. 940, dated 9/25/85, by S. Malak and were re-evaluated in the Chlorpyrifos SRR dated 11/18/88.
[c] These data do not fully satisfy the requirements of 40 CFR §158.155 (Guideline Reference No. 61-1) regarding product identity because the CA-approved chemical name of each inert ingredient in the product, its CAS registry number, and nominal concentration are required.
[d] These data do not fully satisfy the requirements of 40 CFR §158.167 (Guideline Reference No. 61-3) regarding discussion of formation of impurities because a discussion of possible post-production reactions between any of the product's active ingredients and any other component of the product or its packaging, and possible contamination from packaging materials or production equipment is required.
[e] Data are not required; this requirement will be fulfilled by the technical source product.
[f] The temperature for the density determination is required.
[g] New data must be submitted for this requirement.
[h] A description of the method used to determine corrosion characteristics is required.

Case No. 0100
Chemical No. 059101
Case Name: Chlorpyrifos
Registrant: Insecta Sales Inc.
Product(s): 41% FI (EPA Reg. No. 45600-6)

## PRODUCT CHEMISTRY DATA SUMMARY

| Guideline Number | Requirement | Are Data Requirements Fulfilled? [a] | MRID Number [b] |
|---|---|---|---|
| 61-1 | Product Identity and Disclosure of Ingredients | N [c] | 00146503 |
| 61-2 | Starting Materials and Manufacturing Process | N [d] | 00146503 |
| 61-3 | Discussion of Formation of Impurities | Y | 00146503 |
| 62-1 | Preliminary Analysis | N/A [e] | 00145603 |
| 62-2 | Certification of Ingredient Limits | Y | 00146503 |
| 62-3 | Analytical Methods to Verify the Certified Limits | Y | 00146503 |
| 63-2 | Color | Y | 00146503 |
| 63-3 | Physical State | Y | 00146503 |
| 63-4 | Odor | Y | 00146503 |
| 63-5 | Melting Point | N/A [e] | |
| 63-6 | Boiling Point | N/A [e] | |
| 63-7 | Density, Bulk Density or Specific Gravity | N [f] | 00146503 |
| 63-8 | Solubility | N/A [e] | |
| 63-9 | Vapor Pressure | N/A [e] | |
| 63-10 | Dissociation Constant | N/A [e] | |
| 63-11 | Octanol/Water Partition Coefficient | N/A [e] | |
| 63-12 | pH | N [g] | |
| 63-13 | Stability | N/A [e] | |
| 63-14 | Oxidizing or Reducing Action | N | |
| 63-15 | Flammability | Y | 00146503 |
| 63-16 | Explodability | Y | 00146503 |
| 63-17 | Storage Stability | N | |
| 63-18 | Viscosity | Y | 00146503 |
| 63-19 | Miscibility | Y | 00146503 |
| 63-20 | Corrosion Characteristics | N [h] | 00146503 |

[a] Y = Yes; N = No; N/A = Not Applicable.
[b] All references were reviewed under CBRS Nos. 869 through 876, dated 9/27/85, by G. Makhijani and K. Arne, and were re-evaluated in the Chlorpyrifos SRR dated 11/18/88.
[c] These data do not fully satisfy the requirements of 40 CFR §158.155 (Guideline Reference No. 61-1) regarding product identity because the CA-approved chemical name of each inert ingredient in the product, its CAS registry number, and nominal concentration are required.
[d] These data do not fully satisfy the requirements of 40 CFR §158.160-165 (Guideline Reference No. 61-2) regarding starting materials and the manufacturing process because the brand name, trade name, or other commercial designation and information concerning the composition of each inert ingredient and its purpose are required.
[e] Data are not required; this requirement will be fulfilled by the technical source product.
[f] The method and temperature are required for the density determination.
[g] Data pertaining to pH are required if the MP is dispersible in water.
[h] A description of the method used to determine corrosion characteristics is required.

Case No. 0100
Chemical No. 059101
Case Name: Chlorpyrifos
Registrant: Roussel UCLAF, Corp.
Product(s): 25% FIs (EPA Reg. Nos. 432-625 and 432-662)

## PRODUCT CHEMISTRY DATA SUMMARY

| Guideline Number | Requirement | Are Data Requirements Fulfilled? [a] | MRID Number [b] |
|---|---|---|---|
| 61-1 | Product Identity and Disclosure of Ingredients | N [c] | 00146823 00149498 |
| 61-2 | Starting Materials and Manufacturing Process | Y | 00146823 00149498 |
| 61-3 | Discussion of Formation of Impurities | Y | 00146823 00149498 |
| 62-1 | Preliminary Analysis | N/A [d] | 00146823 00149498 |
| 62-2 | Certification of Ingredient Limits | Y | 00146823 00149498 |
| 62-3 | Analytical Methods to Verify the Certified Limits | Y | 00146823 00149498 |
| 63-2 | Color | Y | 00146823 00149498 |
| 63-3 | Physical State | Y | 00146823 00149498 |
| 63-4 | Odor | Y | 00146823 00149498 |
| 63-5 | Melting Point | N/A [d] | |
| 63-6 | Boiling Point | N/A [d] | |
| 63-7 | Density, Bulk Density or Specific Gravity | Y | 00146823 00149498 |
| 63-8 | Solubility | N/A [d] | |
| 63-9 | Vapor Pressure | N/A [d] | |
| 63-10 | Dissociation Constant | N/A [d] | |
| 63-11 | Octanol/Water Partition Coefficient | N/A [d] | |
| 63-12 | pH | Y | 00146823 00149498 |
| 63-13 | Stability | N/A [d] | |
| 63-14 | Oxidizing or Reducing Action | N [e] | 00146823 00149498 |
| 63-15 | Flammability | Y | 00146823 00149498 |
| 63-16 | Explodability | N [e] | 00146823 00149498 |
| 63-17 | Storage Stability | N [e] | 00146823 00149498 |
| 63-18 | Viscosity | Y | 00146823 00149498 |
| 63-19 | Miscibility | Y | 00146823 00149498 |
| 63-20 | Corrosion Characteristics | N [e] | 00146823 00149498 |

[a] Y = Yes; N = No; N/A = Not Applicable.
[b] All references were reviewed under CBRS Nos. 745 and 765, dated 9/11/85, by S. Malak and were re-evaluated in the Chlorpyrifos SRR dated 11/18/88. As noted in CBRS Nos. 746 and 765, the composition of these products is identical.
[c] These data do not fully satisfy the requirements of 40 CFR §158.155 (Guideline Reference No. 61-1) regarding product identity because the CA-approved chemical name of each inert ingredient in the product, its CAS registry number, and nominal concentration are required.
[d] Data are not required; this requirement will be fulfilled by the technical source product.
[e] New data must be submitted for this requirement.

Case No. 0100
Chemical No. 059101
Case Name: Chlorpyrifos

**Registrant**/Product(s): **FMC** 62.5% FI (EPA Reg. No. 279-3134); **Roussel UCLAF** 25% FIs (EPA Reg. Nos. 432-615 and 432-661), 16% FIs (EPA Reg. Nos. 432-570, 432-571, 432-648, 432-649, and 432-692), 15% FIs (EPA Reg. Nos. 432-674 and 432-682); **Sureco Inc.** 44.8% FI (EPA Reg. No. 769-690); **McLaughlin Gormley King Co.** 28.331% FI (EPA Reg. No. 1021-1458), 20% FIs (EPA Reg. Nos. 1021-1215, 1021-1220, 1021-1221, and 1021-1434), 14.286% FI (EPA Reg. No. 1021-1506), and 8.363% FIs (EPA Reg. Nos. 1021-1438, 1021-1442, and 1021-1444); **Agrevo Environmental Health** 25% FI (EPA Reg. No. 4816-657), 10% FI (EPA Reg. No. 4816-634), 5% FIs (EPA Reg. Nos. 4816-622 4816-447, and 4816-638), 2.5% FI (EPA Reg. No. 4816-480), and 0.714% FI (EPA Reg. No. 4816-448); **3M/Animal Care Products** 20% FI (EPA Reg. No. 10350-10); **Makhteshim Chemical Works** 94% FI (EPA Reg. No. 11678-45 and 11678-54); and **Dow AgroSciences** 62.5% FI (EPA Reg. No. 62719-76), 50% FI (EPA Reg. No. 62719-78), and 22.8% FI (EPA Reg. No. 62719-225); Micro-Flo Co. 61.5% FI (EPA Reg. No. 51036-217); Luxembourg-Pamol, Inc. 99% FI (EPA Reg. No. 42519-13).

## PRODUCT CHEMISTRY DATA SUMMARY

| Guideline Number | Requirement | Are Data Requirements Fulfilled? [a] | MRID Number |
|---|---|---|---|
| 61-1 | Product Identity and Disclosure of Ingredients | N | |
| 61-2 | Starting Materials and Manufacturing Process | N | |
| 61-3 | Discussion of Formation of Impurities | N | |
| 62-1 | Preliminary Analysis | N | |
| 62-2 | Certification of Ingredient Limits | N | |
| 62-3 | Analytical Methods to Verify the Certified Limits | N | |
| 63-2 | Color | N | |
| 63-3 | Physical State | N | |
| 63-4 | Odor | N | |
| 63-5 | Melting Point | N | |
| 63-6 | Boiling Point | N | |
| 63-7 | Density, Bulk Density or Specific Gravity | N | |
| 63-8 | Solubility | N | |
| 63-9 | Vapor Pressure | N | |
| 63-10 | Dissociation Constant | N | |
| 63-11 | Octanol/Water Partition Coefficient | N | |
| 63-12 | pH | N | |
| 63-13 | Stability | N | |
| 63-14 | Oxidizing or Reducing Action | N | |
| 63-15 | Flammability | N | |
| 63-16 | Explodability | N | |
| 63-17 | Storage Stability | N | |
| 63-18 | Viscosity | N | |
| 63-19 | Miscibility | N | |
| 63-20 | Corrosion Characteristics | N | |

[a] Y = Yes; N = No; N/A = Not Applicable.

APPENDIX II

## Table B. Food/Feed Use Patterns Subject to Reregistration for Chlorpyrifos (Case 0100).

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Use Limitations |
|---|---|---|---|---|---|
| Crop Uses | | | | | |
| **Alfalfa** | | | | | |
| Soil in-furrow treatment<br>At planting<br>Ground equipment | 15% G | 1 lb/A | 1 | Not Applicable (NA) | Use limited to MO. A 21-day PHI/PGI has been established. |
| Broadcast application<br>Foliar or postemergence<br>Ground, sprinkler irrigation, or aerial equipment | 4 lb/gal EC | 1 lb/A | 1 (per cutting)<br>4 (per season) | -- | A 7-day PHI (rates 0.25 lb ai/A), a 14-day PHI (rates 0.5 lb ai/A), and a 21-day PHI (rates >0.5 lb ai/A) have been established. |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 2 lb/gal EC | 0.5 lb/A | 1 (per cutting)<br>4 (per season) | -- | Use limited to AZ and CA. A 4-day PHI/PGI (rates 0.375-0.5 lb ai/A) has been established. |
| **Almond** | | | | | |
| Spray application<br>Dormant/delayed dormant<br>Ground equipment | 50% WP | 2 lb/A<br>or<br>2 lb/100 gal | 1 | NA | |
| Spray application<br>Dormant/delayed dormant<br>Ground equipment | 1 lb/gal EC<br>4 lb/gal EC | 0.5 lb/100 gal [200-600 gal finished spray/A, 1 lb/A - 3 lb/A] | 1 | NA | Application may be made alone or as a tank mix with petroleum spray oil. Grazing of meat or dairy animals in treated orchards is prohibited. |
| Spray application<br>Foliar<br>Ground or aerial equipment | 50% WP<br>50% DF<br>1 lb/gal EC<br>4 lb/gal EC | 2 lb/A<br>or<br>2 lb/100 gal | 3 | -- | A 14-day PHI has been established. Grazing of livestock in treated orchards is prohibited (Section 3 and CA940017). |

## Table B. Food/Feed Use Patterns Subject to Reregistration for Chlorpyrifos (Case 0100).

| **Site**<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Use Limitations |
|---|---|---|---|---|---|
| **Almonds (cont.)** | | | | | |
| Trunk spray (bark) application<br>Ground equipment | 4 lb/gal EC | 2 lb/A | 1 | -- | Use limited to CA (CA940013).<br>Grazing of livestock in treated orchards is prohibited. |
| Soil broadcast application<br>Orchard floor<br>Ground equipment | 4 lb/gal EC | 4 lb/A | 2 | -- | A 14-day PHI has been established. Grazing of livestock in treated orchards is prohibited. |
| Soil broadcast application<br>Orchard floor<br>Ground equipment | 4 lb/gal EC | 3 lb/100 gal with 1.5 gal spray/tree | 2 | -- | Use limited to CA (CA940024). Grazing of livestock in treated orchards is prohibited. |
| **Apples** | | | | | |
| Spray application<br>Dormant/delayed dormant<br>Ground equipment | 1 lb/gal EC<br>4 lb/gal EC | 0.5 lb/100 gal [200-600 gal finished spray/A] | 1 | NA | Application may be made alone or as a tank mix with petroleum spray oil. Grazing of meat or dairy animals in treated orchards is prohibited. |
| Spray application<br>- branches and trunk<br>Dormant/delayed dormant | 4 lb/gal EC | 2.0 lb/A | 1 | | Use restricted to CA (Section 24(c) CA940013) |

## Table B. Food/Feed Use Patterns Subject to Reregistration for Chlorpyrifos (Case 0100).

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Use Limitations |
|---|---|---|---|---|---|
| **Asparagus** | | | | | |
| Broadcast foliar application<br>Preharvest<br>Ground equipment | 4 lb/gal EC | 1 lb/A | 1 | NA | Use limited to AZ, CA, the Midwest, and Pacific Northwest. A 1-day PHI has been established. |
| Broadcast application<br>Postharvest (fern stage)<br>Ground equipment | 4 lb/gal EC | 1 lb/A | 2 | -- | Use limited to AZ, CA, the Midwest, and Pacific Northwest. |
| **Bananas** | | | | | |
| Fruit bag (shroud) application | 1% Impr | -- | -- | -- | Shrouds are installed on the stem after all fruit bunches have formed and are removed at harvest. |
| **Bean (field, green, kidney, lima, navy, snap, string and wax)** | | | | | |
| Slurry seed treatment<br>Preplant | 50% WP | 1 oz/cwt | (1) | -- | Grazing/feeding of livestock on bean hay grown from treated seed is prohibited. Treated seeds may not be used for food, feed, or oil purposes. |
| Slurry seed treatment<br>Stored seed | 50% WP | 19.3 oz/23.5 gal [3 fl.oz/cwt] | (1) | -- | Use limited to TX. Treated seeds may not be used for food, feed, or oil purposes. |
| **Broccoli** | | | | | |
| Soil band treatment<br>At planting/transplanting<br>Ground equipment<br>or<br>Directed spray application<br>Post-transplant<br>Ground equipment | 0.5% G<br>1% G<br>15% G<br>1 lb/gal EC<br>4 lb/gal EC | 1.4 oz/1,000 ft. of row | 1 | NA | Maximum seasonal application rates of 2.25 lb ai/A (0.5-15% G and 4 lb/gal EC) and 2.6 lb ai/A (1 lb/gal EC) are in effect. A 30-day PHI has been established for the EC formulations. |

## Table B. Food/Feed Use Patterns Subject to Reregistration for Chlorpyrifos (Case 0100).

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Use Limitations |
|---|---|---|---|---|---|
| **Broccoli (continued)** | | | | | |
| Soil band treatment<br>At planting<br>Ground equipment | 4 lb/gal EC | 1.4 oz/1,000 ft. of row | 2 | -- | Use limited to CA (CA940016). Maximum seasonal application rate of 2.25 lb ai/A is in effect. Application may be repeated at thinning time as a directed spray. A 30-day PHI has been established. |
| Soil injected sidedress application | 4 lb/gal EC | 1.3 oz/1,000 ft. of row | 1 | NA | A 30-day PHI has been established. |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 50% WP | 1 lb/A | 6 | -- | A 21-day PHI has been established. Application may be made alone or as a tank mix with other pesticides (AZ870006, AZ940003, CA860066, CA940001). |
| **Broccoli Raab (rapini)** | | | | | |
| Soil application<br>At planting<br>Ground equipment | 4 lb/gal EC | 2.25 lb/A | 1 | NA | Section 24(c) CA940015. |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 50% WP | 1 lb/A | 6 | -- | 40-day PHI. Section 24(c) AZ870006, AZ940003, CA860066, CA940001 |
| **Brussels sprouts** | | | | | |
| Soil band treatment<br>At planting/transplanting<br>Ground equipment<br>or<br>Directed spray application<br>Post-transplant<br>Ground equipment | 0.5% G<br>1% G<br>15% G<br>1 lb/gal EC<br>4 lb/gal EC | 1.4 oz/1,000 ft. of row | 1 | NA | See "Broccoli." |

## Table B. Food/Feed Use Patterns Subject to Reregistration for Chlorpyrifos (Case 0100).

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Use Limitations |
|---|---|---|---|---|---|
| **Brussels sprouts (cont.)** | | | | | |
| Soil band treatment<br>At planting<br>Ground equipment | 4 lb/gal EC | 1.4 oz/1,000 ft. of row | 2 | -- | See "Broccoli." |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 4 lb/gal EC | 1 lb/A | 6 | 7 | A 21-day PHI has been established. |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 50% WP | 1 lb/A | 6 | -- | See "Broccoli." |
| **Cabbage** | | | | | |
| Soil band treatment<br>At planting<br>Ground equipment<br>or<br>Directed spray application<br>Post-transplant<br>Ground equipment | 0.5% G<br>1% G<br>15% G<br>1 lb/gal EC<br>4 lb/gal EC | 1.4 oz/1,000 ft. of row | 1 | NA | See "Broccoli." |
| Soil band treatment<br>At planting<br>Ground equipment | 4 lb/gal EC | 1.4 oz/1,000 ft. of row | 2 | -- | See "Broccoli." |
| Soil injected sidedress application | 4 lb/gal EC | 1.3 oz/1,000 ft. of row | 1 | NA | See "Broccoli." |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 50% WP | 1 lb/A | 6 | -- | See "Broccoli." |

## Table B. Food/Feed Use Patterns Subject to Reregistration for Chlorpyrifos (Case 0100).

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Use Limitations |
|---|---|---|---|---|---|
| **Carrot (grown for seed)** | | | | | |
| Broadcast application<br>Foliar, After Bolting<br>Ground or aerial equipment | 4 lb/gal EC | 1 lb/A | -- | -- | Use limited to WA (WA940002). Feeding of treated carrot cuttings or seed screenings to livestock or grazing of livestock in treated areas is prohibited. |
| **Cauliflower** | | | | | |
| Soil band treatment<br>At planting/transplanting<br>Ground equipment | 0.5% G<br>1% G<br>15% G | 1.4 oz/1,000 ft. of row | 1 | NA | See "Broccoli." |
| Soil band treatment<br>At planting<br>Ground equipment<br>or<br>Directed spray application<br>Post-transplant<br>Ground equipment | 1 lb/gal EC<br>4 lb/gal EC | 1.2 oz/1,000 ft. of row | 1 | NA | Maximum seasonal application rate of 2 lb ai/A is in effect. A 30-day PHI has been established. |
| Soil band treatment<br>At planting<br>Ground equipment | 4 lb/gal EC | 1.2 oz/1,000 ft. of row or 2 lb/A | 2 | -- | Use limited to CA (CA960016). Maximum seasonal application rate of 2 lb ai/A is in effect. A 30-day PHI has been established. |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 50% WP | 1 lb/A | 6 | -- | See "Broccoli." |

## Table B. Food/Feed Use Patterns Subject to Reregistration for Chlorpyrifos (Case 0100).

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Use Limitations |
|---|---|---|---|---|---|
| **Cherries** | | | | | |
| Trunk spray (bark) application<br>Foliar and postharvest and/or dormant/delayed dormant<br>Ground equipment | 1 lb/gal EC<br>4 lb/gal EC | 3 lb/100 gal | 3 | 14 | Use limited to sweet cherries. One of the three permitted applications per season may be applied as a dormant spray tank mixed with petroleum spray oil at 0.5 lb ai/100 gal. A 6-day PHI has been established. Grazing of meat or dairy animals in treated orchards is prohibited. |
| Spray application<br>Foliar<br>Ground or aerial equipment | 50% WP<br>1 lb/gal EC | 1.5 lb/A<br>or<br>1.5 lb/100 gal | 8 | -- | Use limited to sour (tart) cherries. A 14-day PHI has been established. Grazing of livestock in treated orchards is prohibited. |
| **Chinese broccoli (gai lon)** | | | | | |
| Soil application<br>At planting<br>Ground equipment | 4 lb/gal EC | 2.25 lb/A | 1 | NA | See "Broccoli raab." |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 50% WP | 1 lb/gal | 6 | -- | See "Broccoli." |
| **Chinese cabbage (bok choy, napa)** | | | | | |
| Soil band treatment<br>At planting/transplanting<br>Ground equipment<br>or<br>Directed spray application<br>Post-transplant<br>Ground equipment | 0.5% G<br>1% G<br>15% G<br>1 lb/gal EC<br>4 lb/gal EC | 1.4 oz/1,000 ft. of row | 1 | NA | See "Broccoli." |

## Table B. Food/Feed Use Patterns Subject to Reregistration for Chlorpyrifos (Case 0100).

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Use Limitations |
|---|---|---|---|---|---|
| **Chinese cabbage (bok choy, napa) (continued)** | | | | | |
| Soil application<br>At planting<br>Ground equipment | 4 lb/gal EC | 2.25 lb/A | 1 | NA | See "Broccoli." |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 50% WP | 1 lb/A | 6 | -- | See "Broccoli." (AZ870006, AZ940003, CA860066, CA940001) |
| **Chinese mustard (gai choy)** | | | | | |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 50% WP | 1 lb/A | 6 | -- | See "Broccoli, raab." |
| **Citrus** | | | | | |
| Spray application<br>Foliar<br>Ground or aerial equipment | 4 lb/gal EC | 6 lb/A | 1 | 30 | Maximum seasonal application rate of 7.5 lb ai/A is in effect. A 21-day PHI (rates 3.5 lb ai/A) and a 35-day PHI (rates > 3.5 lb ai/A) have been established. Grazing of livestock in treated areas is prohibited. Application may be made alone or as a tank mix with other pesticides. |
| Spray application<br>Foliar<br>Ground or aerial equipment | 4 lb/gal EC | 3.5 lb/A | 2 | 30 | Maximum seasonal application rate of 7.5 lb ai/A is in effect. A 21-day PHI (rates 3.5 lb ai/A) and a 35-day PHI (rates > 3.5 lb ai/A) have been established. Grazing of livestock in treated areas is prohibited. Application may be made alone or as a tank mix with other pesticides. |

## Table B. Food/Feed Use Patterns Subject to Reregistration for Chlorpyrifos (Case 0100).

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Use Limitations |
|---|---|---|---|---|---|
| **Citrus (continued)** | | | | | |
| Spray application<br>Foliar<br>Ground equipment | 4 lb/gal EC | 0.5 lb/100 gal | 2 | 30 | Use limited to residential citrus. A 21-day PHI has been established. |
| Spray application<br>Foliar<br>Ground or aerial equipment | 1 lb/gal EC | 0.4 lb/100 gal | 2 | 30 | Maximum seasonal application rate of 2 lb ai/A is in effect. A 21-day PHI has been established. |
| Trunk spray application<br>Foliar<br>Ground equipment | 4 lb/gal EC | 0.625 lb/A | 4 | -- | Use limited to CA. A 28-day PHI has been established. |
| Fiberglass band application<br>Foliar<br>Ground equipment | 4 lb/gal EC | 2.5 lb/A | 4 | -- | |
| Soil broadcast application<br>Postplant (grove floor)<br>Ground or sprinkler irrigation equipment | 15% G<br>4 lb/gal EC | 1 lb/A | 10<br>3 (FL) | -- | Maximum seasonal application rate of 10 lb ai/A is in effect. A 28-day PHI has been established. Grazing of livestock in treated areas is prohibited. For use in FL, a maximum seasonal rate of 3 lb ai/A (EC) is in effect. |
| **Clover (grown for seed)** | | | | | |
| Soil broadcast application<br>Preplant<br>Ground equipment<br>or<br>Broadcast application<br>Foliar<br>Ground equipment | 4 lb/gal EC | 2 lb/A | 1 | -- | Use limited to OR (OR940031). Grazing or feeding of treated clover cuttings or seed screenings or using of hay for livestock is prohibited.[b] |

## Table B. Food/Feed Use Patterns Subject to Reregistration for Chlorpyrifos (Case 0100).

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Use Limitations |
|---|---|---|---|---|---|
| **Collards** | | | | | |
| Soil band treatment<br>At planting/transplanting<br>Ground equipment<br>or<br>Directed spray application<br>Post-transplant<br>Ground equipment | 0.5% G<br>1% G<br>15% G<br>1 lb/gal EC<br>4 lb/gal EC | 1.4 oz/1,000 ft. of row | 1 | NA | See "Broccoli." |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 50% WP | 1 lb/A | 6 | -- | See "Broccoli, Raab." |
| **Corn: field or sweet or pop or grown for seed** | | | | | |
| Soil incorporated treatment<br>Preplant<br>Ground equipment | 15% G | 2 lb/A | (1) | NA | Maximum seasonal application rate of 2 lb ai/A is in effect. A 35-day PHI (corn grain), a 14-day PGI (corn silage), and a 35-day PFI (corn fodder) have been established. |
| Soil band treatment<br>At planting<br>Ground equipment | 0.5% G<br>1% G<br>7.5% G<br>15% G | 2.4 oz/1,000 ft. of row or 2 lb/A | (1) | NA | |
| Soil band treatment or broadcast application<br>Postplant<br>Ground or aerial equipment | 15% G | 1.2 oz/1,000 ft. of row | (1) | NA | |

## Table B. Food/Feed Use Patterns Subject to Reregistration for Chlorpyrifos (Case 0100).

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Use Limitations |
|---|---|---|---|---|---|
| **Corn: field or sweet or pop or grown for seed (continued)** | | | | | |
| Soil incorporated treatment<br>Preplant<br>Ground equipment | 4 lb/gal EC | 3 lb/A | (1) | NA | Maximum seasonal application rate of 7.5 lb ai/A is in effect. A 35-day PHI (corn grain), a 14-day PGI (corn silage), and a 35-day PFI (corn fodder) have been established. Application may be made alone or as a tank mix with other pesticides. |
| Soil broadcast application<br>Preplant, at planting, or preemergence<br>Ground equipment | 4 lb/gal EC | 1 lb/A | (1) | NA | |
| Broadcast application<br>Postemergence/foliar<br>Ground, aerial, or sprinkler irrigation equipment | 4 lb/gal EC | 1.5 lb/A | (5) | 10 | |
| **Corn: Sweet** | | | | | |
| Broadcast application<br>Foliar<br>Ground, aerial, or sprinkler irrigation equipment | 4 lb/gal EC | 1 lb/A | 11 | -- | Use limited to FL and GA. Maximum seasonal application rate of 11 lb ai/A is in effect. A 21-day PHI (corn ears), PGI, and PFI (corn silage, fodder, or grain) have been established. |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 4 lb/gal EC | 0.5 lb/A | 13 | -- | Use limited to DE (DE930004), A 7-day PHI has been established. Grazing of livestock in treated areas and feeding treated corn silage, forage, or fodder to meat or dairy animals is prohibited.[b] |
| **Corn: Field and Sweet** | | | | | |
| Slurry seed treatment<br>Preplant | 50% WP | 1 oz/cwt | (1) | -- | Treated seeds may not be used for food, feed, or oil purposes. |

## Table B. Food/Feed Use Patterns Subject to Reregistration for Chlorpyrifos (Case 0100).

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Use Limitations |
|---|---|---|---|---|---|
| **Corn: Field and Sweet (continued)** | | | | | |
| Slurry seed treatment<br>Stored seed | 50% WP | 19.3 oz/23.5 gal [3 fl.oz/cwt] | (1) | -- | See "Bean." |
| **Cotton** | | | | | |
| Broadcast application<br>Foliar<br>Ground, sprinkler irrigation, aerial equipment | 4 lb/gal EC | 1 lb/A | 6 | -- | A 14-day PHI has been established. Grazing of livestock in treated areas and feeding of gin trash or treated forage to livestock is prohibited.[b] |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 2 lb/gal EC | 0.5 lb/A | -- | -- | Use limited to AZ and CA. A 40-day PHI has been established. Grazing of livestock in treated areas and feeding of gin trash or treated forage to livestock is prohibited.[b] Applications may be made undiluted at the same rate. |
| Slurry seed treatment<br>Stored seed | 50% WP | 19.3 oz/23.5 gal [3 fl.oz/cwt] | (1) | -- | See "Bean." |
| Gin trash treatment<br>Ground equipment | 4 lb/gal EC | 1 lb per 20 tons of gin trash | -- | -- | Use limited to MS. |
| **Cranberry** | | | | | |
| Broadcast application<br>Foliar<br>Ground, aerial, or sprinkler irrigation equipment | 4 lb/gal EC | 1.5 lb/A | 2 | -- | A 60-day PHI has been established. Application may not be made when bogs are flooded. |
| **Cucumbers** | | | | | |
| Slurry seed treatment<br>Preplant | 50% WP | 1 oz/cwt | (1) | -- | Treated seeds may not be used for food, feed, or oil purposes. |

| Table B. Food/Feed Use Patterns Subject to Reregistration for Chlorpyrifos (Case 0100). | | | | | |
|---|---|---|---|---|---|
| **Site**<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Use Limitations |
| **Figs** | | | | | |
| Soil incorporated treatment<br>Dormant<br>Ground equipment | 4 lb/gal EC | 2 lb/A | 1 | NA | Use limited to CA. A 210-day PHI has been established. |
| **Filberts** | | | | | |
| Spray application<br>Foliar<br>Ground or aerial equipment | 50% WP<br>1 lb/gal EC<br>4 lb/gal EC | 2 lb/A<br>or<br>2 lb/100 gal | 3 | -- | A 14-day PHI has been established. Grazing of livestock in treated orchards is prohibited. |
| **Grapefruit** | | | | | |
| Spray application<br>Foliar<br>Ground or aerial equipment | 4 lb/gal EC | 6 lb/A | 2 | 30 | See "Citrus." |
| Spray application<br>Foliar or transplant<br>Ground or aerial equipment | 4 lb/gal EC | 3.5 lb/A | 2 | 30 | See "Citrus." |
| Spray application<br>Foliar<br>Ground equipment | 4 lb/gal EC | 0.5 lb/100 gal | 2 | 30 | See "Citrus." |
| Spray application<br>Foliar<br>Ground or aerial equipment | 1 lb/gal EC | 0.4 lb/100 gal | 2 | 30 | See "Citrus." |

## Table B. Food/Feed Use Patterns Subject to Reregistration for Chlorpyrifos (Case 0100).

| **Site**<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Use Limitations |
|---|---|---|---|---|---|
| **Grapes** | | | | | |
| Directed spray soil application<br>Ground equipment | 1 lb/gal EC<br>4 lb/gal EC | 2.25 lb/100 gal [2 qt finished spray/15 sq. ft.] | 1 | NA | Use limited to states east of the Rocky Mountains. A 35-day PHI has been established. |
| Directed spray soil application<br>Ground equipment | 4 lb/gal EC | 1.125 lb/100 gal [2 qt finished spray per 15 sq. ft.] | 2 | -- | Use limited to TN (TN940001). A 35-day PHI has been established. |
| Directed spray soil application<br>Ground equipment | 4 lb/gal EC | 1 lb/A | 3 | -- | Use limited to CA (CA940018). A 76-day PHI has been established. |
| Spray/drench application<br>Prebloom<br>Ground equipment | 4 lb/gal EC | 1 lb/A | 1 | NA | Use limited to MI and MO (MI940001 and MO940001). |
| Broadcast foliar application<br>**Nonbearing**<br>Ground or aerial equipment | 4 lb/gal EC | 1 lb/A | -- | -- | Use limited to ID, OR, and WA (ID940013, OR940030, and WA940003). |
| **Grass (grown for seed)** | | | | | |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 4 lb/gal EC | 1 lb/A | 3 | -- | Use limited to OR and NV (OR940032 and NV940002). Grazing of livestock in treated areas or feeding treated grass, straw, or seed screenings to livestock or using hay for livestock bedding is prohibited.[b] |

| Table B. Food/Feed Use Patterns Subject to Reregistration for Chlorpyrifos (Case 0100). | | | | | |
|---|---|---|---|---|---|
| **Site**<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Use Limitations |
| **Kale** | | | | | |
| Soil band treatment<br>At planting/transplanting<br>Ground equipment<br>or<br>Directed spray application<br>Post-transplant<br>Ground equipment | 0.5% G<br>1% G<br>15% G<br>1 lb/gal EC<br>4 lb/gal EC | 1.4 oz/1,000 ft. of row | 1 | NA | See "Broccoli." |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 50% WP | 1 lb/A | 6 | -- | See "Broccoli." |
| **Kohlrabi** | | | | | |
| Soil band treatment<br>At planting/transplanting<br>Ground equipment<br>or<br>Directed spray application<br>Post-transplant<br>Ground equipment | 0.5% G<br>1% G<br>15% G<br>1 lb/gal EC<br>4 lb/gal EC | 1.4 oz/1,000 ft. of row | 1 | NA | See "Broccoli." |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 50% WP | 1 lb/A | 6 | -- | See "Broccoli." |

| Table B. Food/Feed Use Patterns Subject to Reregistration for Chlorpyrifos (Case 0100). | | | | | |
|---|---|---|---|---|---|
| **Site**<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Use Limitations |
| **Lemon** | | | | | |
| Spray application<br>Foliar<br>Ground or aerial equipment | 4 lb/gal EC | 6 lb/A | 2 | 30 | See "Citrus." |
| Spray application<br>Foliar or transplant<br>Ground or aerial equipment | 4 lb/gal EC | 3.5 lb/A | 2 | 30 | See "Citrus." |
| Spray application<br>Foliar<br>Ground equipment | 4 lb/gal EC | 0.5 lb/100 gal | 2 | 30 | See "Citrus." |
| Spray application<br>Foliar<br>Ground or aerial equipment | 1 lb/gal EC | 0.4 lb/100 gal | 2 | 30 | See "Citrus." |
| **Macadamia Nuts** | | | | | |
| Trunk spray (bark) application<br>Ground equipment | 50% WP | 1 lb/A | 8 | 30 | Use limited to HI (HI930010 and HI930011). Maximum seasonal application rate of 8 lb ai/A is in effect. A 14-day PHI has been established. Grazing of livestock in treated areas is prohibited. |
| **Mint - Peppermint** | | | | | |
| Soil incorporated treatment<br>Preplant<br>Ground equipment | 4 lb/gal EC | 2 lb/A | 1 | NA | Use limited to OR (OR940027). Application following a broadcast foliar spray is not permitted. |

| Table B. Food/Feed Use Patterns Subject to Reregistration for Chlorpyrifos (Case 0100). | | | | | |
|---|---|---|---|---|---|
| **Site**<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Use Limitations |
| **Mint - Peppermint (continued)** | | | | | |
| Broadcast foliar application<br>Preharvest and postharvest<br>Ground or sprinkler irrigation equipment | 1 lb/gal EC<br>4 lb/gal EC | 2 lb/A | 1 preharvst +<br>1 postharvest | NA | A 90-day PHI has been established. |
| **Mustard greens** | | | | | |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 50% WP | 1 lb/A | 6 | -- | See "Broccoli." |
| **Nectarines** | | | | | |
| Spray application<br>Dormant/delayed dormant<br>Branches and Trunk<br>Ground equipment | 1 lb/gal EC<br>4 lb/gal EC | 0.5 lb/100 gal [200-600 gal finished spray/A, 1 lb/A-3 lb/A] | 1 | NA | Application may be made alone or as a tank mix with petroleum spray oil. Grazing of meat or dairy animals in treated orchards is prohibited. |
| Spray application<br>Dormant/delayed dormant<br>Branches and Trunk<br>Ground equipment | 4 lb/gal EC | 2/ lb/A | 1 | NA | Use limited to CA (CA940013) |

## Table B. Food/Feed Use Patterns Subject to Reregistration for Chlorpyrifos (Case 0100).

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Use Limitations |
|---|---|---|---|---|---|
| **Nectarines (continued)** | | | | | |
| Trunk spray (bark) application<br>Ground equipment | 1 lb/gal EC<br>4 lb/gal EC | 3 lb/100 gal | 1 | NA | A 14-day PHI has been established. Grazing of meat or dairy animals in treated orchards is prohibited. |
| **Onions, bulb** | | | | | |
| Soil application<br>At seeding<br>Ground equipment | 0.5% G<br>1% G<br>15% G | 0.035 lb/1,000 ft. of row | 1 | NA | Maximum seasonal application rate of 1 lb ai/A is in effect for the 15% G formulation. |
| Soil drench application<br>At seeding<br>Ground equipment | 1 lb/gal EC<br>4 lb/gal EC | 0.04 lb/1,000 ft. of row (1 lb/gal EC)<br><br>0.03 lb/1,000 ft. of row (4 lb/gal EC) | 1 | NA | |
| Soil drench application<br>Post planting<br>Ground equipment | 4 lb/gal EC | 1 lb/A | 2 | | Use limited to MI (MI940002. 60 day PHI. Total number of applications should include both at planting and post crop uses. |
| **Oranges** | | | | | |
| Spray application<br>Foliar<br>Ground or aerial equipment | 4 lb/gal EC | 6 lb/A | 2 | 30 | See "Citrus." |
| Spray application<br>Foliar or transplant<br>Ground or aerial equipment | 4 lb/gal EC | 3.5 lb/A | 2 | 30 | See "Citrus." |

**Table B. Food/Feed Use Patterns Subject to Reregistration for Chlorpyrifos (Case 0100).**

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Use Limitations |
|---|---|---|---|---|---|
| **Oranges (continued)** | | | | | |
| Spray application<br>Foliar<br>Ground equipment | 4 lb/gal EC | 0.5 lb/100 gal | 2 | 30 | See "Citrus." |
| Spray application<br>Foliar<br>Ground or aerial equipment | 1 lb/gal EC | 0.4 lb/100 gal | 2 | 30 | See "Citrus." |
| **Peaches** | | | | | |
| Spray application<br>Dormant/delayed dormant<br>Ground equipment | 1 lb/gal EC<br>4 lb/gal EC | 0.5 lb/100 gal [200-600 gal finished spray/A] | 1 | NA | See "Nectarines." |
| Trunk spray (bark) application<br>Ground equipment | 4 lb/gal EC | 3 lb/100 gal | 1 | NA | See "Nectarines." |
| Dip application<br>Preplant (nonbearing) | 4 lb/gal EC | 3 lb/100 gal | 1 | NA | |
| **Peanuts** | | | | | |
| Soil incorporated treatment<br>Preplant<br>Ground equipment | 4 lb/gal EC | 2 lb/A | 1 | NA | A combined maximum seasonal application rate of 4 lb ai/A is in effect for preplant and postplant use. A 21-day PHI has been established. Feeding peanut forage or hay to meat or dairy animals is prohibited. |

## Table B. Food/Feed Use Patterns Subject to Reregistration for Chlorpyrifos (Case 0100).

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Use Limitations |
|---|---|---|---|---|---|
| **Peanuts (continued)** | | | | | |
| Soil band application<br>At planting, postplant, or early pegging<br>Ground equipment | 0.5% G<br>1% G<br>15% G | 2.25 oz ai/1,000 ft. of row<br>(2 lb/A) | 2 | NA | A maximum seasonal application rate of 4.5 oz ai/1,000 ft. of row or 4 lb ai/A for the 15% G formulation is in effect. A maximum seasonal rate of 2.25 oz ai/1,000 ft. of row is in effect. A 21-day PHI has been established. Feeding peanut forage or hay to meat or dairy animals is prohibited. |
| Broadcast application<br>Prior to or at pegging<br>Aerial equipment | 15% G | 1.95 lb/A | -- | -- | A maximum seasonal application rate of 4 lb ai/A is in effect. A 21-day PHI has been established. Feeding peanut forage or hay to meat or dairy animals is prohibited. |
| Directed spray application<br>Foliar<br>Ground equipment | 1 lb/gal EC | 2 lb/A | 1 | NA | A 21-day PHI has been established. A maximum seasonal application rate of 2 lb ai/A is in effect. |
| **Pears** | | | | | |
| Spray application<br>Dormant/delayed dormant<br>Ground equipment | 1 lb/gal EC<br>4 lb/gal EC | 0.5 lb/100 gal [200-600 gal finished spray/A] | 1 | NA | See "Apples." |
| Spray application<br>Dormant/delayed dormant<br>Branches and Trunk | 4 lb/gal EC | 2 lb/A | 1 | NA | Use limited to CA (CA940013). |
| **Peas (black-eyed, field, and garden)** | | | | | |
| Slurry seed treatment<br>Preplant | 50% WP | 1 oz/cwt | (1) | -- | See "Bean." |

## Table B. Food/Feed Use Patterns Subject to Reregistration for Chlorpyrifos (Case 0100).

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Use Limitations |
|---|---|---|---|---|---|
| **Peas (black-eyed, field, and garden) (continued)** | | | | | |
| Slurry seed treatment<br>Stored seed | 50% WP | 19.3 oz/23.5 gal [3 fl.oz/cwt] | (1) | -- | See "Bean." |
| **Pecans** | | | | | |
| Spray application<br>Foliar<br>Ground or aerial equipment | 50% WP<br>50% DF<br>1 lb/gal EC<br>4 lb/gal EC | 1 lb/100 gal<br>or<br>1 lb/A (50% WP, 50% DF, and 1 lb/gal EC)<br><br>2 lb/A (4 lb/gal EC) | 5 | -- | A maximum seasonal application rate of 10 lb ai/A is in effect for the 4 lb/gal EC formulation. Application may be made alone or as a tank mix with other pesticides. A 28-day PHI has been established. The grazing of livestock in treated orchards is prohibited. |
| Soil broadcast application<br>Orchard floor<br>Ground equipment | 50% WP<br>1 lb/gal EC<br>4 lb/gal EC | 1 lb/100 gal<br>or<br>1 lb/A (50% WP and 1 lb/gal EC)<br><br>2 lb/A (4 lb/gal EC) | 5 | -- | |
| **Peppers** | | | | | |
| Broadcast application<br>Foliar<br>Ground equipment | 50% WP | 1 lb/A | 8 | - | Use limited to FL and GA (FL920007, FL920009, GA930003, and GA930004). A 7-day PHI has been established. |
| Broadcast application<br>Foliar<br>Ground equipment | 50% WP | 1 lb/A | 8 | | Use limited to NM and TX (NM95001). A 14 day PHI has been established. |

## Table B. Food/Feed Use Patterns Subject to Reregistration for Chlorpyrifos (Case 0100).

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Use Limitations |
|---|---|---|---|---|---|
| **Plum/Prune** | | | | | |
| Spray application<br>Dormant/delayed dormant<br>Ground equipment | 1 lb/gal EC<br>4 lb/gal EC | 0.5 lb/100 gal [200-600 gal finished spray/A, 1 lb/A -3 lb/A] | 1 | NA | See "Apples." |
| Spray application<br>Dormant/delayed dormant<br>Ground or aerial equipment | 4 lb/gal EC | 2 lb/A | 1 | NA | Use limited to CA (CA940013) |
| **Pumpkin** | | | | | |
| Slurry seed treatment<br>Preplant | 50% WP | 1 oz/cwt | (1) | -- | See "Bean." |
| **Radish** | | | | | |
| Soil in-furrow treatment<br>At planting<br>Ground equipment | 0.5% G<br>1% G<br>15% G<br>1 lb/gal EC<br>4 lb/gal EC | 0.5 oz/1,000 ft. of row (2.75 lb/A) | 1 | NA | A maximum seasonal application rate of 2.75 lb ai/A is in effect for the 0.5-15% G, 1 lb/gal EC and 4 lb/gal EC formulations. |
| **Radish (grown for seed)** | | | | | |
| Soil incorporated treatment<br>Preplant<br>Ground equipment | 4 lb/gal EC | 2 lb/A | (1) | NA | Use limited to OR (OR94033). Grazing of livestock in treated areas or the feeding of radish cuttings or seed screenings to livestock is prohibited. |

## Table B. Food/Feed Use Patterns Subject to Reregistration for Chlorpyrifos (Case 0100).

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Use Limitations |
|---|---|---|---|---|---|
| **Rape** | | | | | |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 50% WP | 1 lb/A | 6 | -- | See "Broccoli." |
| **Rutabagas** | | | | | |
| Soil band treatment<br>At planting/transplanting<br>Ground equipment | 0.5% G<br>1% G<br>15% G | 1.4 oz/1,000 ft. of row (2.25 lb/A) | 1 | NA | Maximum seasonal application rate of 2.25 lb ai/A is in effect. The use of rutabaga tops for food/feed purposes is prohibited. |
| | 4 lb/gal EC | 1.6 oz/1,000 ft. of row (2.25 lb/A) | 1 | NA | |
| Soil band treatment<br>At planting<br>Ground equipment | 1 lb/gal EC | 1.3 oz/1,000 ft. of row | 1 | NA | Maximum seasonal application rate of 1.9 lb ai/A is in effect. The use of rutabaga tops for food/feed purposes is prohibited. |
| **Sorghum** | | | | | |
| Soil band incorporated treatment<br>At planting<br>Ground equipment | 15% G | 1.8 oz/1,000 ft. of row (1.5 lb/A) | 1 | NA | |

## Table B. Food/Feed Use Patterns Subject to Reregistration for Chlorpyrifos (Case 0100).

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Use Limitations |
|---|---|---|---|---|---|
| **Sorghum (continued)** | | | | | |
| Broadcast application<br>Foliar<br>Ground, sprinkler irrigation, or aerial equipment<br>or<br>Directed spray application<br>Foliar<br>Ground equipment | 4 lb/gal EC | 1 lb/A | -- | -- | Maximum seasonal application rate of 1.5 lb ai/A is in effect. A 30-day PHI/PGI/PFI for rates 0.5 lb ai/A and a 60-day PHI/PGI/PFI for rates >0.5 lb ai/A have been established. Use on sweet sorghum is prohibited. |
| Slurry seed treatment<br>Stored seed | 50% WP | 19.3 oz/23.5 gal [3 fl.oz/cwt] | (1) | NA | See "Bean." |
| **Soybean** | | | | | |
| Soil incorporated treatment<br>At planting or postemergence<br>Ground equipment | 15% G | 1.2 oz/1,000 ft. of row | 1 | NA | |
| Soil band application<br>At planting<br>Ground equipment or<br>Directed soil band application,<br>Postemergence<br>Ground equipment or<br>Broadcast spray application<br>Foliar<br>Ground, sprinkler irrigation, or aerial equipment | 4 lb/gal EC | 1 lb/A | -- | 14 (between final two applications) | Maximum seasonal application rate of 3 lb ai/A is in effect. A 28-day PHI has been established. Grazing of livestock in treated areas or the feeding of treated soybean forage, hay, and straw to meat or dairy animals is prohibited. |

## Table B. Food/Feed Use Patterns Subject to Reregistration for Chlorpyrifos (Case 0100).

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Use Limitations |
|---|---|---|---|---|---|
| **Strawberry** | | | | | |
| Soil incorporated treatment<br>Preplant<br>Ground equipment | 4 lb/gal EC | 2 lb/A | 1 | NA | Use limited to ID, OR, and WA (ID940012, OR940035, and WA94004) Application made one year before harvest season. |
| Broadcast foliar application<br>Prebloom<br>Ground equipment | 1 lb/gal EC<br>4 lb/gal EC | 1 lb/A | 2 | 10 | A 21-day PHI has been established. |
| Broadcast foliar application<br>Prebloom<br>Ground equipment | 1 lb/gal EC<br>4 lb/gal EC | 1 lb/A | 1 pre-plant<br>2 foliar | 10 (foliar) | A 21-day PHI has been established. |
| Directed spray application<br>Postharvest<br>Ground equipment | 4 lb/gal EC | 1 lb/A | 2 | 14 | Use limited to OR (OR940034). |
| **Sugar beet** | | | | | |
| Soil band application<br>At planting or postemergence (two- to four-leaf stage)<br>Ground equipment | 15% G | 1.35 oz/1,000 ft. of row<br>or<br>2 lb/A (based on a 22-inch row spacing) | 1 | NA | |

## Table B. Food/Feed Use Patterns Subject to Reregistration for Chlorpyrifos (Case 0100).

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Use Limitations |
|---|---|---|---|---|---|
| **Sugar beet (continued)** | | | | | |
| Soil incorporated treatment<br>Preplant<br>Ground equipment<br>or<br>Soil band application<br>At planting<br>Ground equipment | 4 lb/gal EC | 4.6 oz/100 ft row (30 in row) or 1 lb/A | (1) | NA | Maximum seasonal application rate of 4 lb ai/A is in effect. A 30-day PHI/PGI have been established. Application may be made alone or as a tank mix with other pesticides. |
| Broadcast application<br>Foliar<br>Ground or aerial equipment<br>or<br>Soil band application<br>Foliar<br>Ground equipment | 4 lb/gal EC | 1 lb/A | 4 | -- | Maximum seasonal application rate of 4 lb ai/A is in effect. A 30-day PHI/PGI have been established. |
| **Sugar beet (grown for seed)** | | | | | |
| Soil broadcast application<br>Preplant<br>Ground equipment | 4 lb/gal EC | 2 lb/A | 1 - fall before harvest season | NA | Use limited to ID and OR (ID950018 and OR940028). |
| **Sunflower** | | | | | |
| Soil band application<br>At planting<br>Ground equipment | 0.5% G<br>1% G<br>15% G | 1.25 oz/1,000 ft. of row | 1 | NA | |

## Table B. Food/Feed Use Patterns Subject to Reregistration for Chlorpyrifos (Case 0100).

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Use Limitations |
|---|---|---|---|---|---|
| **Sunflower (continued)_** | | | | | |
| Soil incorporated treatment<br>Preplant<br>Ground equipment | 4 lb/gal EC | 2 lb/A | 1 | NA | Maximum seasonal application rate of 4.5 lb ai/A is in effect. A 42-day PHI has been established. Grazing of livestock in treated areas is prohibited. |
| Broadcast foliar application<br>Postemergence<br>Ground or aerial equipment | 4 lb/gal EC | 1.5 lb/A | 3 | 7 | |
| **Sweet Potato** | | | | | |
| Soil incorporated treatment<br>Preplant<br>Ground equipment | 0.5% G<br>1% G<br>15% G<br>1 lb/gal EC<br>4 lb/gal EC | 2 lb/A | 1 | NA | A 125-day PHI has been established. |
| **Tobacco** | | | | | |
| Soil incorporated treatment<br>Pre-transplant<br>Ground equipment | 15% G<br>4 lb/gal EC | 3 lb/A | 1 | NA | |
| Soil incorporated treatment<br>Pre-transplant<br>Ground equipment | 4 lb/gal EC | 5 lb/A | 1 | NA | Use limited to NC, SC, and VA. |

| Table B. Food/Feed Use Patterns Subject to Reregistration for Chlorpyrifos (Case 0100). | | | | | |
|---|---|---|---|---|---|
| **Site**<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Use Limitations |
| **Tobacco (continued)** | | | | | |
| Soil incorporated treatment<br>Pre-transplant<br>Ground equipment | 4 lb/gal EC | 2 lb/A | 1 | NA | Tank mix use in all tobacco growing regions. |
| **Turnip** | | | | | |
| Soil band treatment<br>At planting/transplanting<br>Ground equipment<br>or<br>Directed spray application<br>Post-transplant<br>Ground equipment | 0.5% G<br>1% G<br>15% G<br>1 lb/gal EC<br>4 lb/gal EC | 1.4 oz/1,000 ft. of row | 1 | NA | See "Broccoli." |
| **Walnuts** | | | | | |
| Spray application<br>Dormant/delayed dormant<br>Ground or aerial equipment | 50% WP | 2 lb/A<br>or<br>2 lb/100 gal | 1 | NA | |

## Table B. Food/Feed Use Patterns Subject to Reregistration for Chlorpyrifos (Case 0100).

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Use Limitations |
|---|---|---|---|---|---|
| **Walnuts (continued)** | | | | | |
| Spray application<br>Foliar<br>Ground or aerial equipment | 50% WP<br>50% DF<br>1 lb/gal EC<br>4 lb/gal EC | 2 lb/A<br>or<br>2 lb/100 gal | 2 | -- | A 14-day PHI has been established. Grazing of livestock in treated orchards is prohibited. |
| Soil spray application<br>Ground equipment | 4 lb/gal EC | 4 lb/A | 2 | | A 14-day PHI has been established. Grazing of livestock in treated orchards is prohibited. Ant control for orchard floors. |
| **Wheat** | | | | | |
| Broadcast application<br>Foliar<br>Ground, sprinkler irrigation, or aerial equipment | 4 lb/gal EC | 0.5 lb/A | 2 | -- | A 14-day PHI for forage and hay, and a 28-day PHI for grain and straw have been established. |
| Animal uses | | | | | |
| **Cattle (beef, calves, and lactating and non-lactating dairy)** | | | | | |
| Ear tag treatment | 5% Impr | Two ear tags/animal | -- | -- | One tag is attached to each ear when pests first appear in the spring. Tags may be replaced as needed. |
| **Outdoor turkey pens** | | | | | |
| Soil treatment<br>Before turkeys are transferred to pens<br>Ground equipment | 50% WP<br>50% DF | 4 lb/A | 2 | 28 | Direct application to turkeys is prohibited. A 7-day PSI has been established. Open feed should be covered during spraying and water troughs should be flushed out immediately after spraying operations. |

| Table B. Food/Feed Use Patterns Subject to Reregistration for Chlorpyrifos (Case 0100). | | | | | |
|---|---|---|---|---|---|
| **Site**<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Use Limitations |
| Food-handling establishment uses | | | | | |
| **Food-Handling Establishments** | | | | | |
| Spot and/or crack and crevice treatment<br>Coarse low pressure sprayer or paint brush | 1 lb/gal Mcap<br>1.7 lb/gal Mcap | 0.5% spray | -- | 14 | |
| Spot and/or crack and crevice treatment<br>Coarse low pressure sprayer or paint brush | 2 lb/gal EC<br>4 lb/gal EC<br>0.5% RTU | 0.5% spray | -- | 7 | Applications may be repeated at 7-day intervals in food service establishments and every 14 days in other types of food handling establishments. Emergency application may be made 2 days after the last treatment; limited to one emergency treatment per month. |

[a] Unless protective clothing is worn.
[b] According to Table 1 (OPPTS, 860.1000) label restrictions on these commodities are not practical and will no longer be accepted.

# Table C. Residue Chemistry Science Assessments for Reregistration of Chlorpyrifos.

**NOTE:** If additional data are required as indicated below, before starting field trials the registrant should consult the OPPTS Test Guidelines Series 860 - Residue Chemistry (EPA 712C-96-169, August 1996)

| GLN: Data Requirements | Current Tolerances, ppm [40 CFR] | Must Additional Data Be Submitted? | References [1] |
|---|---|---|---|
| 860.1200: Directions for use | | Yes [2] | See Table B. |
| 860.1300: Plant Metabolism | | No | **00066724**, **00066725**, **00072657**, **00072660**, 00157541, 00157542, 00157543, 40638801,[3] 40638802,[3] 41829007 [4] |
| 860.1300: Animal Metabolism | | No | **00077055**, 00154734,[5] 00161743,[6] 40638802,[3] PP#3F1306 |
| 860.1340: Residue Analytical Methods | | No | **00034031, 00037455, 00037457, 00037458, 00039642, 00039643, 00051801, 00058089, 00071201, 00084330, 00084331, 00095179, 00095201, 00095216, 00095251, 00095383, 00095387, 00095436, 00134720**, 00141725,[7] 00148881,[8] 00155578, 00155579, 00155580, 00157713, 00158566,[9] 00158567,[9] 00158568,[9] 00158569,[9] 00162109, 00164187,[10] 40131301, 40131302, 40288501 |
| 860.1380: Storage Stability | | No | **00033586, 00034031, 00044555, 00051798, 00077120, 00095227, 00095260, 00095374, 00101566, 00116675, 00134720**, 00162109, 41653502 [11] |
| 860.1500: Magnitude of the Residue in Plants | | | |
| <u>Root and Tuber Vegetables Group</u> | | | |
| - Radish, fresh | 2 [180.342(c)] | No | **00095259** |
| - Rutabagas, root | 0.5 [180.342(c)] | No | **00095259** |
| - Sugar beets, root | 1.0 [180.342(a)] | No | **00039641, 00101566** |
| - Sweet potatoes, root | 0.05 [180.342(c)] | No | **00095227** |

| GLN: Data Requirements | Current Tolerances, ppm [40 CFR] | Must Additional Data Be Submitted? | References [1] |
|---|---|---|---|
| - Turnip, root | 1 [§180.342(c)] | No | **00095259** |
| Leaves of Root and Tuber Vegetables Group | | | |
| - Sugar beets, tops | 8.0 [§180.342(a)] | No | **00039641, 00101566** |
| - Turnip, tops | 0.3 [§180.342(c)] | No | **00095259** |
| Bulb Vegetables Group | | | |
| - Leeks | 0.5 (of which no more than 0.2 ppm is chlorpyrifos) [§180.342(b)] | No [12] | 00157909 [13] |
| - Onions, dry bulb (only) | 0.5 [§180.342(a)] | No | **00154019**, 42649001 [14] |
| Brassica Leafy Vegetables Group | 2.0 (of which no more than 1.0 ppm is chlorpyrifos) [§180.342(a)] | No | **00095273**, 00155580,[15] 00158566 [9] |
| - Broccoli | 1 [§180.342(c)] | No | **00095273**, 00155580, 00158566 [9] |
| - Brussels sprouts | 1 [§180.342(c)] | No | **00095273**, 00158566 [9] |
| - Cabbage | 1 [§180.342(c)] | No | **00095273**, 00155580, 00158566 [9] |
| - Cabbage, Chinese | 1 [§180.342(c)] | No | **00095273** |
| - Cauliflower | 1 [§180.342(c)] | No | **00095273**, 00158566 [9] |
| Legume Vegetables (Succulent or Dried) Group | 0.05 [§180.342(c)] | No | **00095216, 00095264** |
| - Beans, lima | 0.05 [§180.342(a)] | No [16] | |
| - Beans, snap | 0.05 [§180.342(a)] | No | 42245907 [17] |
| - Soybeans | 0.3 [§180.342(c)] | Yes [18] | **00095270** |
| Foliage of Legume Vegetables Group | | | |
| - Beans, vines | 0.7 [§180.342(c)] | No | **00095264**, 42245907 [17] |
| - Beans, lima, vines | 1.0 [§180.342(a)] | No [19] | |
| - Beans, snap, vines | 1.0 [§180.342(a)] | No [19] | 42245907 [17] |
| - Peas, vines | 0.7 [§180.342(c)] | No | **00095264** |

| GLN: Data Requirements | Current Tolerances, ppm [40 CFR] | Must Additional Data Be Submitted? | References [1] |
|---|---|---|---|
| - Soybeans, forage | 0.7 [§180.342(c)] | No | **00095270** |
| Fruiting Vegetables (except cucurbits) Group | | | |
| - Peppers | 1.0 [§180.342(a)] | Yes [20] | |
| - Tomatoes | 0.5 [§180.342(a)] | No[21] Tolerance Revoked | **00095251**, 00131864, PP#03008 |
| Cucurbit Vegetables Group | | | |
| - Cucumbers | 0.05 [§180.342(c)] | No | **00095264** |
| - Pumpkins | 0.05 [§180.342(c)] | No | **00095264** |
| Citrus Fruits Group | 1.0 [§180.342(a)] | No | **00084326, 00095260** |
| Pome Fruits Group | | | |
| - Apples | 1.5 [§180.342(a)] | No | **00044555, 00088978, 00095264** |
| - Pears | 0.05 [§180.342(e)] | No | **00044555,** 43445601[23] |
| Stone Fruits Group | | | |
| - Cherries | 1 [§180.342(c)] | No[22] | **00044555, 00072408, 00077120, 00095856** |
| - Nectarines | 0.05 [§180.342(e)] | No [23] | **00261114** |
| - Peaches | 0.05 [§180.342(e)] | No | **00261114, 00044555, 00095179** |
| - Plums (fresh prunes) | 0.05 [§180.342(e)] | No | **00261114, 00044555** |
| Small Fruits and Berries Group | | | |
| - Blueberry | 2 (of which no more than 1 ppm is chlorpyrifos) [§180.342(a)] | No [24] | 00164187 [10] |
| - Caneberries (*Rubus* spp.) | 1.0 [§180.342(c)] | No [25] | PP#7E3557 |
| - Cranberries | 1.0 [§180.342(a)] | No | **00108813** |
| - Grapes | 0.5 [§180.342(b)] | No | **00085785**, 00126713, 00134499, PP#3F02872/ 3H05393 |
| - Strawberries | 0.2 [§180.342(c)] | No | **00052967, 00095271,** 40131302 |

| GLN: Data Requirements | Current Tolerances, ppm [40 CFR] | Must Additional Data Be Submitted? | References [1] |
|---|---|---|---|
| Tree Nuts Group | 0.2, tree nuts and 12.0, almond hulls [§180.342(a)] | No [26] | **00132786**, **00044555, 00116675**, 41424401 [27] |
| Cereal Grains Group | | | |
| - Corn, field, grain | 0.05 [§180.342(c)] | No | **00070509** |
| - Corn, sweet (K + CWHR) | 0.1 [§180.342(a)] | No | **00095216**, 42245904 [17] |
| - Sorghum, grain (milo) | 0.75 [§180.342(a)] | Yes [28] | **00046785, 00095249**, 42245905 [17], 43191402 [29] |
| - Wheat, grain | 0.5 [§180.342(c)] | Yes [30] | PP#3F2947/FAP#3H5411 |
| Forage, Fodder, and Straw of Cereal Grains Group | | | |
| - Corn, fodder | 8 [§180.342(c)] | Yes [31] | **00070509, 00078962** |
| - Corn, forage | 8 [§180.342(c)] | Yes [31] | **00070509, 00078962** |
| - Sorghum, fodder (milo) | 6.0 [§180.342(a)] | No [28] | **00046785**, 00158569 [9], 43191402[32] |
| - Sorghum, forage (milo) | 1.5 [§180.342(a)] | No [28] | **00046785**, 00158569 [9], 43191402[33] |
| - Wheat, forage | 3 [§180.342(c)] | No | PP#3F2947/FAP#3H5411 |
| - Wheat, straw | 6 [§180.342(c)] | No | PP#3F2947/FAP#3H5411 |
| Non-grass Animal Feeds (forage, fodder, straw, and hay) Group | | | |
| - Alfalfa, forage | 3 [§180.342(c)] | No | **00125686**, 00158567,[9] 00158568,[9] 41739001 [34] |
| - Alfalfa, hay | 13 [§180.342(c)] | No | **00125686**, 00158567,[9] 00158568,[9] 41739001 [35] |
| Herbs and Spices Group | | | |
| - Dill | | No [36] | |
| Miscellaneous Commodities | | | |
| - Asparagus | 5.0 [§180.342(b)] | No [37] | **00094088** |
| - Bananas | 0.1 (bananas), 0.01 (bananas, pulp) §180.342(c)] | No | **00125686** |
| - Cherimoya | 0.05 [§180.342(d)] | No [38] | PP#7E3536 |
| - Cottonseed | 0.2 [§180.342(c)] | Yes [39] | **00095373**, 40131303 |

| GLN: Data Requirements | Current Tolerances, ppm [40 CFR] | Must Additional Data Be Submitted? | References [1] |
|---|---|---|---|
| - Dates | 0.5 (of which no more than 0.3 ppm is chlorpyrifos) [§180.342(b)] | No [40] | 00162109 |
| - Feijoa (pineapple guava) | 0.05 [§180.342(d)] | No [38] | PP#7E3536 |
| - Figs | 0.01 [§180.342(c)] | No | **00098580** |
| - Kiwifruits | 2.0 [§180.342(a)] | No | **00115260** |
| - Mint | 0.8 [§180.342(c)] | No[41] | **00034031** |
| - Mushrooms | 0.1 [§180.342(a)] | No Revoke Tolerance | **00129295** |
| - Okra | | No [42] | |
| - Peanuts | 0.2 (peanuts) 2 (peanuts, hulls) [§180.342(c)] | No [43] | **00025942, 00083840, 00095263** |
| - Sapote | 0.05 [§180.342(d)] | No [38] | PP#7E3536 |
| - Sugarcane | 0.01 [44] [§180.342(c)] | No Revoke Tolerance | 42645401 [45] |
| - Sunflower | 0.25 (seeds) [§180.342(a)] | No [46] | **00084845**, 42245906 [17], 43181401 [47] |
| - Tobacco | | No | 40265201 |
| <u>Crops Grown Solely for Seed</u> | | | |
| - Carrots | None Established | No [48] | |
| - Clover forage, seed, and hay | None Established | Yes [49] | |
| - Grass forage and hay | None Established | Yes [50] | |
| 860.1520: Magnitude of the Residues in Processed Food/Feed | | | |
| - Alfalfa | | No [51] | **00125686**, 00158567,[9] 00158568 [9] |
| - Apples | 12.0 (dried pomace) [§186.1000(a)] | No | **00044555, 00088978, 00095264** |

| GLN: Data Requirements | Current Tolerances, ppm [40 CFR] | Must Additional Data Be Submitted? | References [1] |
|---|---|---|---|
| - Citrus | 25.0 (oil) [§185.1000(a)], 5.0 (dried pulp) [§186.1000(a)] | No | **00084326** |
| - Corn, field | 3.0 (oil) [§185.1000(a)], 1.0 (soapstock) [§186.1000(a)] | No [52] | **00084266**, 42649002 [14] |
| - Corn, sweet | | No [53] | 42649002 [14] |
| - Cottonseed | | No [54] | **00037455** |
| - Figs | | No [55] | |
| - Grapes | 2.0 (dried pomace) [§186.1000(a)] | No | **00085785**, 00126713, 00134499, PP#3F02872/30H5393 |
| - Mint | 8 (oil) [§185.1000(d)] | No | **00034031** |
| - Peanuts | 0.4 (oil) [§185.1000(d)] | No | **00025942, 00083840, 00095263** |
| - Plums | | No [54] | **00044555** |
| - Sorghum | 1.5 (milling fractions) [§185.1000(a)] | No [56] | **00046785, 00095249** |
| - Soybeans | | No [54] | **00095270** |
| - Sugar beet | 5.0 (dried pulp) 15.0 (molasses) [§186.1000(a)] | No | **00039641, 00101566** |
| - Sugarcane | | No [57] | 42645401 [45] |
| - Sunflower | 0.5 (hulls) [§186.1000(a)] | No [58] | **00084846**, 42245906 [17], 43181401 [59] |
| - Tomatoes | | No | **00095251** |
| - Wheat | 1.5 (milling fractions, exc. flour) [§185.1000(d)] | No | PP#3F2947/FAP#3H5411 |

860.1480: Magnitude of the Residue in Meat, Milk, Poultry, and Eggs

| GLN: Data Requirements | Current Tolerances, ppm [40 CFR] | Must Additional Data Be Submitted? | References [1] |
|---|---|---|---|
| - Cattle | 0.3 (fat) [§180.342(c)] | No | **00058087, 00095179, 00095438** |
| - Goats, hogs, and sheep | 0.2 (fat) [§180.342(c)] | No | **00058087, 00095179, 00095438** |
| - Cattle, goats, hogs, and sheep | 0.05 (meat and meat byproducts) [§180.342(c)] | Yes[60] | **00058087, 00095179, 00095438** |
| - Horses | 0.25 (fat, meat, and meat byproducts) [§180.342(c)] | No | **00058087, 00095179, 00095438** |
| - Poultry | 0.1 (fat, meat, and meat byproducts) [§180.342(c)] | No | **00058087, 00095179, 00095438** |
| - Milk, fat | 0.25 [§180.342(c)] | No | **00095179**, 42542701 [61] |
| - Milk, whole | 0.01 [§180.342(c)] | No | **00095179**, 42542701 [60] |
| - Eggs | 0.01 [§180.342(c)] | No | **00095179** |
| 860.1400: Nature and Magnitude of the Residue in Drinking and Irrigation Water | | No | |
| 860.1460: Magnitude of the Residue in Food-Handling Establishments | | No | **00090562, 00090563** |
| 860.1850: Rotational Crops (Confined) | | No[62] | 43210801[61] |
| 860.1900: Rotational Crops (Field) | | No[61] | |

[1] **Bolded** references were reviewed in the Residue Chemistry Science Chapter of the Reregistration Standard dated 2/29/84. Unbolded references were reviewed in the SRR of 11/18/88. Otherwise, references were reviewed as noted.

2. Label revisions are required for some crops and are noted in appropriate crop section.

3. CB No. 3938, 9/23/88, S. Willett.

4. CBRS No. 7907, DP Barcode D163645, 1/7/91, C. Olinger.

5. CBRS No. 501, 3/25/85, R. Loranger.

6. CB No. 1429, 1/21/87, M. Bradley.

7. No CBRS No., 8/16/84, S. Malak.

8. CB No. 992, 7/15/85, N. Dodd.

9. CB Nos. 2933, 2934, and 2939, 3/9/88, S. Willett.

10. CB No. 1562, 4/30/87, W. Chin.

11. CBRS No. 7368, DP Barcode D158705, 1/24/92, C. Olinger.

12. As there are no registered uses of chlorpyrifos on leeks, the established tolerance for leeks should be revoked.

13. CB No. 798, 7/7/86, N. Dodd; and CB No. 1803, 2/2/87, N. Dodd.

14. CBRS No. 11372, DP Barcode D188151, 8/26/93, S. Knizner and CBRS No. 14106, 8/15/94, S. Knizner.

15. CB Nos. 464 and 465, 4/1/86, M. Metzger.

16. Residue data submitted for snap beans satisfy the data requirements for lima beans.

17. CBRS No. 9638, DP Barcode D176281, 5/19/92, L. Cheng.

18. Data are required for soybean aspirated grain fractions (see Guidance Document entitled "Aspirated Grain Fractions (Grain Dust): A Tolerance Perspective", June, 1994).

19. The tolerances for beans, vines, and for vines of lima and snap beans should be revoked. Bean vines and hay are not considered significant animal feed items.

20. For peppers, the requirements specified by the Addendum to the Chlorpyrifos SRR to submit English translations of labels for all products that permit use of chlorpyrifos on peppers imported to the U.S. have not been fulfilled. Since issuance of the SRR, SLN (FL920007, FL920009, GA930003, GA930004, NM95001) uses of chlorpyrifos on peppers have been approved.

21. For tomatoes, the requirements specified by the Addendum to the Chlorpyrifos SRR to submit English translations of labels for all products that permit use of chlorpyrifos on tomatoes imported to the U.S. have not been fulfilled. These data requirements remain outstanding. Since issuance of the SRR, SLN (FL920010, GA930003, and GA930004) uses of chlorpyrifos on tomatoes have been approved. The domestic uses of chlorpyrifos on tomatoes are supported by adequate residue data.

22. The registrant, in a letter to the Agency dated 5/8/95, committed to conducting bridging studies designed to show the similarity between a water dissolvable granule and the EC formulation.

23. N.Dodd, 10/2/95, CBTS #14,781 and 15923 and R. Loranger, 12/4/95, Note to PP#4E4289 (no DP Barcode or MRID number).

24. As there are no registered uses of chlorpyrifos on blueberries, the established tolerance for blueberries should be revoked.

25. As there are no registered uses of chlorpyrifos on caneberries (*Rubus* spp.), the established tolerance for caneberries should be revoked.

26. For tree nuts group, the Addendum to the Chlorpyrifos SRR did not require additional data. However, as noted in the 9/16/94 HED Product and Residue Chemistry Chapter of the RED, an examination of the amended labels for the 4 lb/gal EC formulation (EPA Reg. Nos. 62719-23 and 62719-220) indicates that a maximum seasonal rate of 10 lb ai/A was inadvertently approved for pecans. The available residue data, reflecting combined residues of chlorpyrifos and TCP in/on pecans and other representative members of this crop group, only support a maximum seasonal rate of 5 lb ai/A. The registrant has now revised the

labels for pecans to reflect a maximum seasonal rate of 5 lb ai/A. Because chlorpyrifos labels permit application only to almonds, filberts, pecans, walnuts, (all foliar applications) and macadamia nuts (only trunk spray {bark} application, SLNs HI930010 and HI930011), DowAgrosciences has requested that only these nuts be considered in the dietary exposure assessment. HED has no objections to this request based on revocation of the crop group tolerance and establishment of individual tolerances for the aforementioned nuts.

27. CBRS No. 6582, 6/19/90, K. Dockter.

28. Data are required for sorghum aspirated grain fractions (see Guidance Document entitled "Aspirated Grain Fractions (Grain Dust): A Tolerance Perspective", June, 1994). The sorghum magnitude of the residue study for sorghum grain, forage, and fodder is fully acceptable (CBRS #13,498, DP Barcode D201562, 5/23/94, S.Knizner). In the Tolerance Reassessment Chapter of the RED, tolerances for residues of chlorpyrifos per se should be revised as follows: sorghum grain 0.5 ppm; sorghum forage 0.5 ppm; and sorghum fodder 2.0 ppm. Although a sorghum processing study, depicting chlorpyrifos residues in sorghum milled fractions was required by the SRR, residue data are no longer required at this time because sorghum flour in the US is used exclusively as a component for drywall, and not as either a human or animal feed item. The Agency reserves the right to require these data if needed at a later date (Table 1, OPPTS 860.1000). (Residue Chemistry) of the Pesticide Assessment Guidelines", August, 1996).

29. CBRS No. 13,498, 5/23/94, S.Knizner.

30. Data are required for wheat aspirated grain fractions (see Guidance Document entitled "Aspirated Grain Fractions (Grain Dust): A Tolerance Perspective", September 1995). Residue data are now also required for wheat hay (Table 1, OPPTS, 860.1000, August, 1996).

31. Label restrictions prohibiting feeding of forage, or fodder to meat or dairy animals are not practical (Table 1, OPPTS 860.1000) and must be removed from SLN DE930004 and FL940003 labels. Additional data must be submitted to determine if established tolerances on corn forage and fodder are adequate for these uses. Alternatively, these SLN uses may be deleted.

32. CBRS No. 13,498, 5/23/94, S.Knizner.

33. CBRS No. 13,498, 5/23/94, S.Knizner.

34. CBRS No. 7627, 4/4/91, C. Swartz and CBRS No. 7955, DP Barcode D164122, 5/9/91, C. Swartz.

35. CBRS No. 7627, 4/4/91, C. Swartz and CBRS No. 7955, DP Barcode D164122, 5/9/91, C. Swartz.

36. According to the REFS database, dill is not listed as a use site for chlorpyrifos; hence, the requirement for a magnitude of the residue study for dill is waived (CBRS No. 9235, DP Barcode D173011, 4/15/92, C. Olinger; and CBRS No. 12483, DP Barcode D194679, 9/17/93, S. Knizner). The registrant, in a letter to the Agency dated 12/20/91 stated that none of their products are registered for use on dill. No tolerances for dill are presently in 40 CFR 180.342, and the obsolete “Seed and Pod Vegetable” crop group tolerance has been recommended for revocation.

37. For asparagus, no additional residue data are required. However, a label revision is needed. The maximum equivalent rate of 1.9 lb ai/A specified by a homeowner-use label (EPA Reg. No. 62719-56) should be adjusted to reflect the maximum registered rate of 1.0 lb ai/A for which adequate residue data are available. In a letter to the Agency dated 5/8/95, the registrant committed to correcting the label directions to 1.0 lb ai/A at the next label printing.

38. There are presently no registered uses of chlorpyrifos on cherimoya, feijoa, and sapote. The current regional tolerances on these fruit commodities, originally established to support their uses in CA, should be revoked.

39. Residue data are required for cotton gin byproducts. Feeding restrictions for cotton gin byproducts (gin trash) are no longer considered practical and will not be accepted (Table 1, OPPTS 860.1000).

40. As there are no registered uses of chlorpyrifos on dates, the established tolerance for dates should be revoked.

41. According to Table 1, OPPTS Test Guidelines Series 860, August 1996, the raw agricultural commodities are peppermint and spearmint tops (leaves and stems), not mint hay. Residue data for fresh mint were provided in MRID #00034031. No additional data are required.

42. According to the REFS data base, okra is not listed as a use site for chlorpyrifos; hence, the requirement for a magnitude of the residue study for okra is waived (CBRS No. 9235, DP Barcode D173011, 4/15/92, C. Olinger; and CBRS No. 12483, DP Barcode D194679, 9/17/93, S. Knizner). The registrant, in a letter to the Agency dated 12/20/91 stated that none of their products are registered for use on okra. No tolerances for okra are presently in 40 CFR 180.342, and the obsolete "Seed and Pod Vegetable" crop group tolerance has been recommended for revocation.

43. Feeding restrictions for peanut hay are acceptable (Table 1, OPPTS 860.1000).

44. A tolerance of 0.01 ppm for residues of chlorpyrifos *per se* in/on sugarcane has recently been established (FR 10287, 3/4/94) in conjunction with PP#3E4192. No tolerance for sugarcane forage is required since the proposed uses include a restriction against the feed use of sugarcane forage.

45. CBTS No. 11397, DP Barcode D188233, 7/6/93, J. Morales; and CBTS No. 12276, DP Barcode D193356, 8/2/93, J. Morales.

46. For sunflower, the data submitted in response to the Addendum to the Chlorpyrifos SRR (CBRS No. 9638, DP Barcode 176281, 5/19/92, L. Cheng) were deemed inadequate because separate residue levels of chlorpyrifos *per se* in/on sunflower seeds and hulls were not provided. Subsequently, separate data were provided for sunflower hulls (MRID #4318401). The sunflower processing study was fully acceptable. In the Tolerance Reassessment Chapter of the Reregistration Eligibility Document (RED), tolerances for residues of chlorpyrifos per se in/on sunflower seed should be set at 0.1 ppm. (CBRS #13,498, DP Barcode D201562, 5/23/94, S.Knizner).

47. CBRS #13,498, 5/23/94, S.Knizner.

48. This use no longer appears on the Dow technical label. Registration Division is in the process of removing use from all labels.

49. The Oregon Clover Association has indicated (CBRS No. 9235, DP Barcode D173011, 4/15/92, C. Olinger) that it will support chlorpyrifos SLN (OR850032) use on clover grown for seed. The requirements specified in the Addendum to the Chlorpyrifos SRR remain outstanding.

50. For grasses grown for seed, appropriate tolerances for residues of chlorpyrifos *per se* in/on grass forage, hay and seed screenings must be proposed. The proposal must be supported by adequate residue data conducted according to the maximum use patterns specified by CA900007, ID830005, OR830007, SD870006, and WA830009. Alternatively, these SLN uses may be canceled.

51. The requirements for processing data on alfalfa meal is waived because residue data indicate that levels of chlorpyrifos *per se* are not likely to exceed the established tolerance in alfalfa hay following tests

conducted according to registered uses (CB Nos. 2933, 2934, and 2939, 3/9/88, S. Willett).

52. Corn processing study reviewed by S. Knizner, 9/26/93, MRID #42649002.

53. No sweet corn processing data are required since adequate field corn data are available.

54. Residues of chlorpyrifos *per se* are not likely to concentrate in processed fractions of cottonseed, plums, and soybeans.

55. The data requirement depicting residues of chlorpyrifos in dried figs is waived (CB No. 501, 3/25/85, R. Loranger).

56. The established tolerance for sorghum milled fractions should be revoked. According to Table 1, OPPTS 860.1000, Residue data for sorghum flour are not needed at this time because it is used exclusively as a component of drywall, and not as a food or animal feed item, in the US. However, because 50% of the worldwide sorghum production is used for human consumption, data may be needed at a later time.

57. In an evaluation of a recently submitted petition (PP#3E4192), CBTS concluded that residues of chlorpyrifos are not likely to concentrate (above the established RAC tolerance) in the processed fractions of sugarcane.

58. The sunflower processing study (MRID #413841401) is fully acceptable. Tolerances for residues of chlorpyrifos per se in/on sunflower seed should be set at 0.1 ppm.

59. CBRS #13,498, 5/23/94, S.Knizner.

60. A meat cooking study is required to confirm 0.5X reduction factor for cooked meat. A protocol should be submitted prior to initiation of study.

61. CBTS No. 10941, DP Barcode D185093, 1/8/93, M. Flood.

62. S.Knizner, CBRS #13710, DP Barcode D203434, MRID #43210801, 6/22/94. When chlorpyrifos was applied to soil at less than the maximal seasonal application rate (4.8 lb ai/A, 0.8X), at the 30 day plant back interval TRR levels in all the rotational crops examined exceeded 0.010 ppm and chlorpyrifos per se was found at up to 0.009 ppm. Therefore, field rotational crop trials (Guideline 165-2) will be required to support a 30 day plant back interval. When conducting field rotational crop trials, an application rate of 6.0 lb ai/A should be used. Samples should be analyzed for residues of chlorpyrifos per se. DowElanco responded to the S.Knizner review of 6/22/94 in a letter to the Agency dated 8/12/94. DowElanco proposed to limit the maximum application rate on its chlorpyrifos products to 5 lb ai/A/season on those crops where rotation to another crop could occur. **Provided that DowElanco modifies all labels for its chlorpyrifos containing products to limit application to 5 lb ai/A/season on those crops where rotation to another crop could occur, CBRS will not require field rotational crop studies. Furthermore, a 30 day plant back interval for rotational crops would then be appropriate. (S.Knizner, 9/13/94, CBRS #14256, DP Barcode D206739).**